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# THE

# Dental Summary

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THE DENTAL SUMMARY

The Magazine That Helps

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# REGULAR CONTRIBUTIONS

## CAVITY PREPARATION FOR FILLINGS AND INLAYS*

(Illustrated by Stereopticon)

BY FRED. W. GETHRO, D.D.S., CHICAGO, ILL.

IN PRESENTING what must necessarily be a short paper on such an extensive subject as cavity preparation, it is obvious, to attempt to cover the subject would be impossible. The great difficulty in a paper of this kind is to boil it down to a reasonable length and yet give the things that will be of greatest value. Having in mind that it is always better to make things clearer, even at the expense of cutting down the amount of ground covered, I have deemed it wise to limit my attention to some of the more important points.

Stereopticon pictures explain some of the conditions so much better than words, and these ocular demonstrations are so much more convincing than any written description that I shall be intentionally brief in some places in the paper and explain details when the pictures are on the screen.

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*Read before the Ohio State Dental Society.

While the title given by your program committee would presume to confine me to the subject of cavity preparation, the "whys" seem important enough to justify something of an appeal to your members for improved cavity preparation. We must admit that many of the resulting conditions we meet with in our professional work are not just as we would like to find them. I believe that any observing dentist will have to admit that cavity preparation is not well done by the average operator.

Decay is essentially a disease of childhood and new areas of decay in adults, I mean decay beginning on areas not previously filled, are comparatively few. If you were to keep an accurate record of operations performed for adults, I am sure that most of you would be surprised at the large percentage of refillings—cavities that have been previously filled. Expressed differently, most of the filling operations for adults are called for by decay recurring around previous fillings. Various causes may contribute to this condition, but none contribute such a large percentage as faulty cavity preparation. Just *why* would seem the important question.

Let me put the question plainly to you. Why is cavity preparation not well done by the profession at large? Is it because it is not well understood, or could it be that dentists do not believe in the newer methods taught? Or is it because many do not care to cut tooth structure beyond that part which seems to be decayed? Could it be accounted for because dentists feel that they cannot afford to take the time required and put in the energy and skill necessary for more perfect results? I have given this subject some thought and I am forced to believe that while all of these things have a bearing, the latter reason, referred to above, outweighs all of the others. These questions are important, for if we are to change the attitude of the general profession on this or any other point, we must know why they are not doing it and then reason from their point of view. In other words, if we believe they are mistaken, we must be able to show them that they are wrong and that the method we advocate is not only correct but to the interest of both patient and dentist. I can anticipate what many dentists would say if I should describe a somewhat ideal method of preparing a cavity, giving the various steps in the order that they should be executed, and then following with the detail of the procedure for placing either a gold or an amalgam filling, taking into consideration the gaining of sufficient separation and the many details necessary for the polishing of the filling so as to leave a contact point of normal form. What most of them would say would not vary much from the following:

"You couldn't prepare cavities and finish fillings that way and make a living in my part of the country." One dollar (I am putting this high, as an average) is about what the general public expects to pay and in reality what they do pay for amalgam fillings. So far as I am able to judge, taking into consideration the increase in time and material, the same ratio exists in all other classes of operating, whether it happens to be gold fillings, inlays, crowns, etc.

No thinking dentist will admit for a moment that it is possible to give the necessary time and skill to properly prepare a cavity and place a filling as it should be done for any such fee as the one just referred to. But I can hear a majority of men repeat, "you couldn't do it in the part of the country where I come from." Gentlemen, this is not so. The public will pay anything within reason—anything within their power, and pay it gladly—if they believe they are getting value received. It is our mission to educate them into the truth of the situation, and then they will not be found lacking. It must always be remembered that a dentist is a teacher, that one of the chief objects is to teach the public—teach his patients, and especially teach patients over the chair.

For instance, we should teach patients that decay can occur only on areas that are not clean, that clean surfaces of teeth do not and cannot decay. We should inform them that almost all of these areas can be kept clean by the patient, and carefully teach them how to do it. The value of the pulp should be impressed upon the patient. When it is found necessary to involve the pulp in a cavity preparation, we find most patients are glad to have this pulp removed, if it can be done without much pain. They are laboring under the impression, or more properly the delusion, that the removal of the pulp is the very last word of any trouble, so far as that tooth is concerned. It is wrong to permit our patients to hold opinions so detrimental to their welfare. If this same patient was correctly informed that in most cases the pulps of the teeth are absolutely essential to their future usefulness and that alveolar abscesses can occur only after the death or removal of the pulp, the patient would look upon it differently. It would impress upon the patient the importance of frequent examination, so that cavities could be found while small, and it would also put an added responsibility on the dentist, for the patient will dread the loss of the pulp, and the dentist will see to it that decay does not go so far as to involve the pulps. Patients should know that the discoloration that usually accompanies death or removal of the pulp, bad as it is, is tame compared to what may follow—such as abscess in the bone, loss of tooth, or maybe several teeth, death of much bone, necessitating in some cases an operation that may be somewhat serious or blood poisoning that may even cause death—all of this from what is termed by the patient as "ulcerated tooth." When a patient is informed of what may result from these conditions, can anyone believe that such a patient will look lightly on the loss of the pulp? My opinion is that the public will do their part if we do ours. If we educate parents about the importance of finding these decays early, the children will be brought to us frequently. Parents are very careful of their children, so far as they know how to be. The reason that decay in the mouths of children is neglected is because parents believe that sooner or later these teeth are to be lost and that it is of no importance.

It might seem to many of us that cavity preparation is well understood, that its principles are plain and that these principles are put into practice by the profession. However, my experience as an observer and teacher does not bear out this position. I am from a part of the country where cavity preparation is supposed to be well understood; where we have schools that are doing good teaching, and I know that scientific cavity preparation is not practiced by the general profession. We may well ask, why?

In order to get this subject before us, it would be well first to have a full understanding of what scientific cavity preparation really is. Is it simply removing the decay found in a tooth and so shaping the remaining tooth that it will hold a filling? By no means, and yet this is the sort of cavity preparation that is being practiced by a great number in the practice of dentistry. To understand cavity preparation, one must know dental anatomy well, histology thoroughly, and he must know the pathology of the dental caries. Too many approach this from the mechanical side only. While the preparation of the cavity is mechanical treatment, it is mechanical treatment of a disease. Dental caries is a disease—a pathological condition, and to successfully treat this condition requires a minute knowledge of this pathology. One cannot hope to understand scientific cavity preparation until he knows the pathology thoroughly. He must understand the manner of attack, know the conditions that govern its progress and the things that limit its progress. The histology of the tooth structure must be given very serious consideration and careful study, and all cavity walls must be made in conformity with this knowledge. To do all other things perfectly and fail in this one part is simply inviting failure.

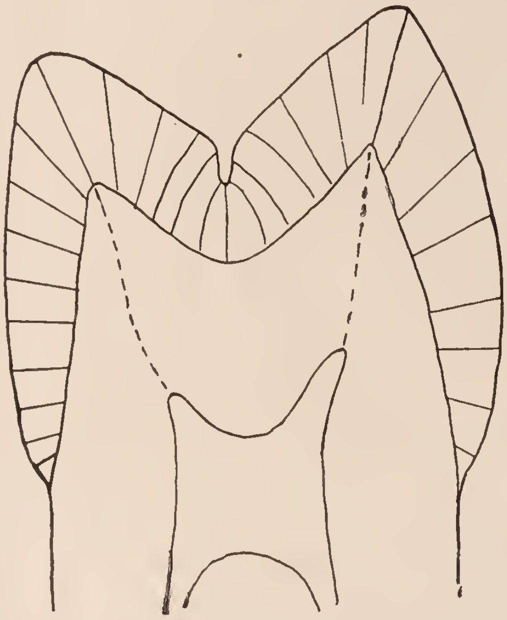


Fig 1

A bicuspid tooth split bucco-lingually, showing the directions of the enamel rods in the different parts of the plane of the cut. The recessional lines of the horns of the pulp are shown by the dotted lines.—*G. V. Black's Oper. Den.*

The enamel structure is peculiar and the enamel margin requires special attention. A slight variation on a given wall may make a weak cavity margin a strong one and an apparently similar variation on another cavity wall may give just the opposite result. We know that enamel is one of the hardest substances to cut and yet it has a grain that is not unlike wood (see Fig. 1), which when taken advantage of permits us to cleave this enamel structure much like one would split wood. In order to do this with ease, one must have the proper cutting instruments, properly sharpened, and know just how to attack this tooth structure. It is hardly possible for me to more than mention the histological structure of this enamel. Briefly, enamel is composed of enamel rods held together by a cementing substance. The cementing substance has not the strength of the enamel rods, and when pressure is applied in the proper direction the enamel will split parallel to the length of the rods. As a general statement, it can be said that enamel rods run at right angles to the surface on which they occur, or, stated in another way, their direction is parallel to a line drawn from the center of the crown toward the various surfaces. This latter statement will also give one a very fair knowledge of the variation of the direction of these rods at the gingival line and at the approaches to the angles and cusps. However, it must be emphasized, that in this paper nothing more definite about these directions can be given. In other words, it is simply impossible to lay down definite rules. There is such a variation in teeth that each tooth becomes a study in itself, and the operator must find these variations while preparing the cavity. How is this to be done? The only way I know of is by the use of hand-cutting instruments, feeling for the direction of the rods. This reason alone is sufficient to compel us to use hand-cutting instruments for the preparation of enamel cavity walls. It will be recognized that what I have just said about hand-cutting instruments refers to enamel and not at all to dentin. The cutting of dentin is an entirely different material, and in many cases the better method of cutting is with the engine and burs, though these are generally used too much. Cavity preparation, if understood and properly executed, lays the foundation for the prevention of diseases of the gums, the so-called pyorrhea, etc. I firmly believe that if cavities were properly prepared and the fillings executed on a par with this correct preparation, that it would practically prevent the larger percentage of diseases of the gums.

Certain parts of every surface of each tooth, and this in the aggregate includes much the greater portion of the entire surface of each tooth, are free from the beginnings of decay. Decay may progress to any point and finally include all of a tooth, but, under normal conditions, there are only these certain places on which decay can have a beginning. This spreading of decay just referred to does not occur on the outer surface of the tooth, but from within, following the dento-enamel junction. These areas or susceptible places are divided into two main divisions. They are pit and fissure cavities and smooth surface cavities.

Pit and fissure cavities will be considered first because the requirements, while they are not simple, are very limited as compared with the other group—the smooth surface cavities. The opportunity for the beginning of pit and fissure cavities is given by imperfections in the enamel and are considered and treated in an entirely different manner from smooth surface cavities. At the points of beginning of smooth surface cavities, the surface of the enamel is smooth and free from imperfections. Decay occurs here because food is permitted to lodge in certain regions and give protection to the micro-organisms and the formation of plaques. In cavities of the pit and fissure group we do not have decay progressing on the surface of the tooth. In smooth surface cavities we find just the opposite condition, for decay spreads on the surface of the enamel within somewhat definite areas. (See Fig. 2.) Pit and fissure cavities can only occur where there is an imperfection, as a deep pit, in the enamel cap at the junction of two or more lobes. Micro-organisms find protection by either food products or a gelatinoid plaque, or some other substance, which prevents the dissipation of the acids they produce. This protection could never obtain on the occlusal surface under a normal condition of the use of the teeth if it were not for the imperfections. While the cavity preparation for this sort of cavity is comparatively simple, no detail should be omitted. The frequency with which many large cavities are found on the occlusal surfaces, many extending so as to involve the pulp, serves to warn us that too many look upon the preparation of these cavities as easy. Certainly cavity prepara-

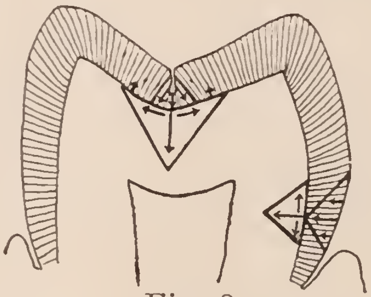


Fig. 2

A diagrammatic representation of the penetration of enamel and dentin in the central pit of the occlusal surface, and also on the smooth buccal surface, in a molar tooth cut bucco-lingually in the axial plane.—*G. V. Black's Oper. Den.*

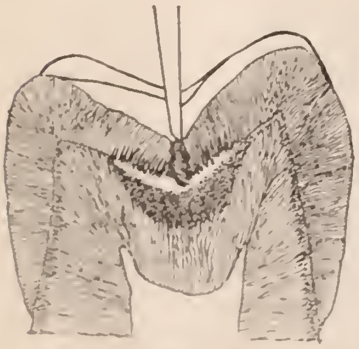


Fig. 3

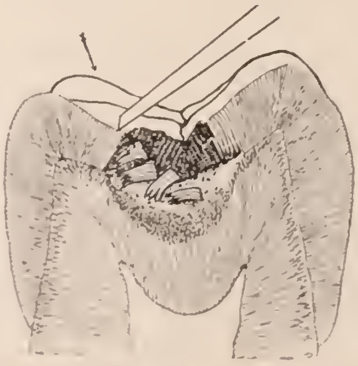


Fig. 4

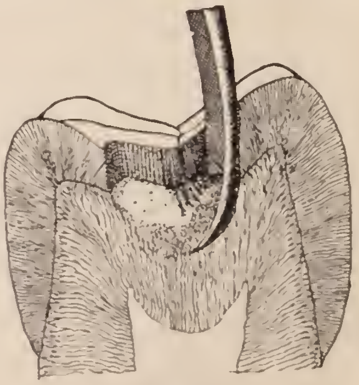


Fig. 5

Fig. 3. The excavation of deep occlusal cavities in the molars, illustrated progressively in pen pictures of a cavity in an upper molar, split bucco-lingually. The enamel and dentin are distinguished definitely in each picture. In this case the tooth represented is from a young person in which the horns of the pulp are still very long and in danger of exposure. Opening the cavity with a chisel.—*G. V. Black's Oper. Den.*

Fig. 4. Further progress in chipping away the undermined enamel, using the chisel with the pulling movement.—*G. V. Black's Oper. Den.*

Fig. 5. Removing softened material with spoon 20-9-12. In this case this is done before squaring up the dentin walls because there is believed to be danger of exposing the pulp of the tooth.—*G. V. Black's Oper. Den.*

tion in these cases is not seriously difficult, and we have little excuse to offer if we fail.

As an illustration of a cavity of this class, I will describe the preparation of the typical form of cavity in an occlusal pit of an upper first molar. (See Figs. 3, 4 and 5.) First, it is necessary that all enamel undermined by decay be removed and that we have sound, full-length enamel rods, supported by sound dentin. After this requirement is satisfied and the floor of the cavity is made flat and at right angles to the long axis of the tooth, nothing more is necessary excepting where there are fissures or deep grooves in the enamel that will not permit of a good finish in the completed filling. When either of these conditions obtain it is necessary to extend the cavity, by opening out the deep grooves, to a place that will permit of a perfect finish to the filling. The only variation in this pit cavity preparation that would seem necessary to mention is where the pit cavity is deep, involving the dentin approaching the pulp. (See Figs. 6 and 7.)

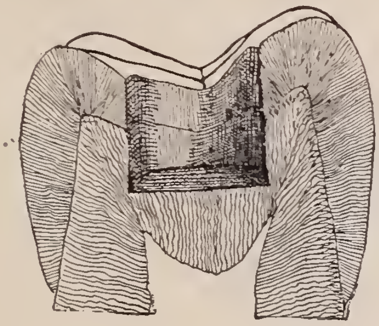


Fig. 6

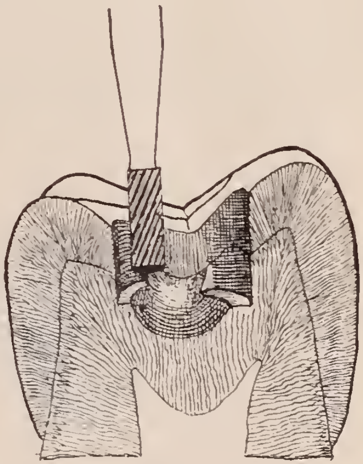


Fig. 7

Fig. 6. The cavity with the dentin walls squared up to the full depth of the decayed area. The proximity of the cutting to the recessional lines of the marginal crests of the pulp, which may be traced in the picture, shows that to square up the dentin walls to this depth would be a very dangerous proceeding, because of the great liability of exposing the horns of the pulp.—*G. V. Black's Oper. Den.*

Fig. 7. Using the fissure bur for squaring up the dentin walls and cutting a ledge around the deeper part of the cavity.—*G. V. Black's Oper. Den.*

In taking up the smooth surface cavities, I am going to consider as a typical form of cavity the mesio-occlusal or disto-occlusal cavities found in bicuspids and molars. There are but four areas on teeth, except under a very limited number of accidental happenings, where smooth surface cavities can have their beginnings, namely, on the gingival third of the buccal and lingual surfaces, and on certain definite portions of the mesial and distal surfaces. Cavities on the gingival third of the lingual surfaces of teeth are comparatively rare and need not occupy any of our time. Cavities on the gingival third of the buccal or labial surfaces are comparatively simple cavities, and I will not consume any time describing them. Much of what I will say of the mesio-occlusal and disto-occlusal cavities, especially in reference to extension for prevention, will apply to gingival third cavities on the buccal and labial surfaces. Mesial and distal cavities in bicuspids and molars call for practically the same treatment, so we are narrowed down to a mesio-occlusal or disto-occlusal cavity. In the mesio-occlusal cavity we find the typical form of cavity, constituting a large percentage of our operations. It also constitutes the most difficult portion of cavity preparation, and I might add, the kind that results in many failures.

Decay on this mesial surface has its beginning just gingivally of the point of contact and spreads buccally and lingually toward the angles of the tooth. If we should examine a thousand extracted molar teeth in which decay had progressed on the mesial surface, we would find that this area is quite definite in its form, depending upon various conditions, such as variations of the contact point, in the insufficiency of gingival tissue to fill out interstices between the teeth, or redundancy of the gingivae so often occurring in young people, bad forms of the gingivae which promote lodgments of debris, limitations in the use of the teeth and of the natural scrubbing which vigorous mastication brings, and the condition of the saliva with reference to deposits of its colloicles, the care by the patient in artificial cleaning, etc. Let me call your attention to some of these conditions. First is the contact point. This may be very narrow and the surfaces may just touch at one small point, just as two marbles touch as they are brought together. (See Figs. 8 and 9.) This is the ideal form. The contact may be wide and broad. This is about the worst form of contact. Next the proximal surfaces of the teeth may be quite convex or only slightly so, or in some cases quite flat both bucco-lingually and occluso-gingivally. The tooth may be considerably bell-crowned, which is quite ideal, or the mesial and distal surfaces may be almost parallel, which is bad form. All of these conditions, and others which I will speak of later, govern the extent of this spreading of decay on this surface of the tooth.

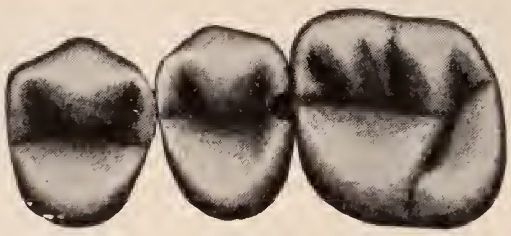


Fig. 8

Fig. 8. A series illustrating the use of the prominent contact point. Caries in the distal surface of a second bicuspid, which makes a broad contact with the first molar.—*G. V. Black's Oper. Den.*

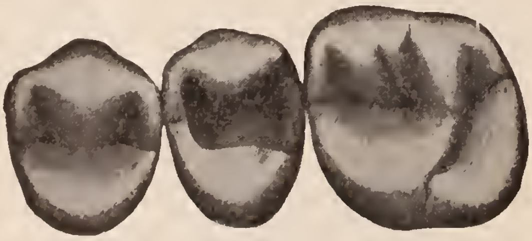


Fig. 9

Fig. 9. Cavity prepared and filled after separating sufficiently to make a prominent contact point to carry the surfaces apart and hold the embrasures wide enough open for cleanliness of the cavity margins.—*G. V. Black's Oper. Den.*

I will now describe the detail of the preparation of this mesial cavity, most of which is done with the hand-cutting instruments, telling you just where I will place each wall and the reasons why. It is impossible to properly prepare this cavity without cutting through to the occlusal, so I will first chip away the enamel from the occlusal with a small, straight chisel, the width of the blade being one millimeter. (See Figs. 10 and 11.) Having brought this to the occlusal, I will prepare the buccal and lingual walls with a straight chisel, the width of blade being one and one-half to two millimeters. The buccal and lingual walls are carried sufficiently close to the angles of the tooth so that the excursion of food in the act of mastication will keep the margins of the cavity clean. These walls must be parallel to the long axis of the tooth and follow the direction of the enamel rods. (See Fig. 12.) The gingival wall is made flat and at right angles to the long axis of the tooth and is placed under the free margin of the gum, for we know that decay never begins under healthy gum tissue. The depth of this mesial

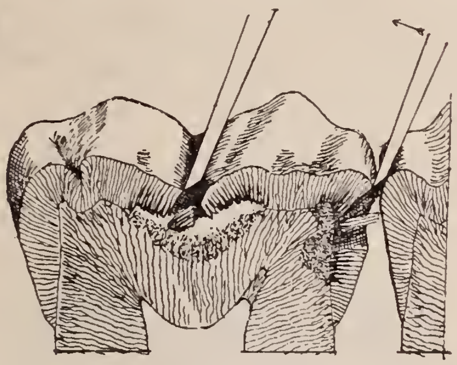


Fig. 10

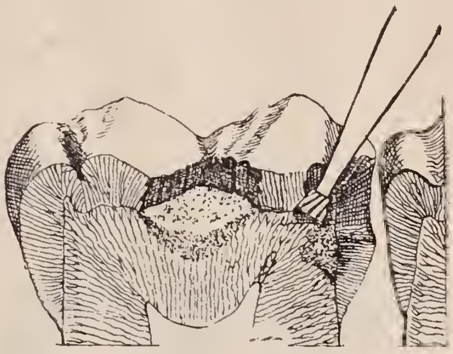


Fig. 11

Fig. 10. A series of pen pictures illustrating methods of excavating deep mesio-occlusal cavities and avoiding pulp exposure. The tooth is cut mesio-distally and only the buccal half is used. The dento-enamel-junction is made diagrammatically prominent. The cut is, of course, not in the line of any of the horns of the pulp, but the recessional line of the mesial crest of the margin of the pulp is darkened for a space, representing the probable length of the mesio-buccal horn of the pulp. The chisel in position for beginning chipping away the undermined enamel over each of decayed areas. The first chip is represented as broken away in each.—*G. V. Black's Oper. Den.*

Fig. 11. The inverted cone bur 10 in position for cutting a slot through the sound portion of enamel between the two cavities.—*G. V. Black's Oper. Den.*

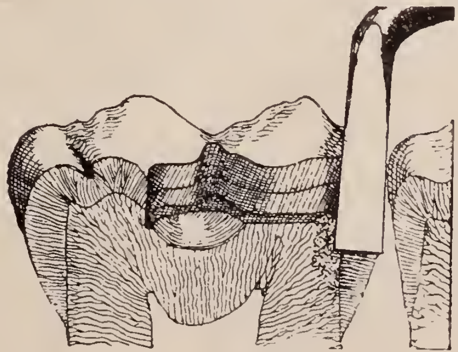


Fig. 12

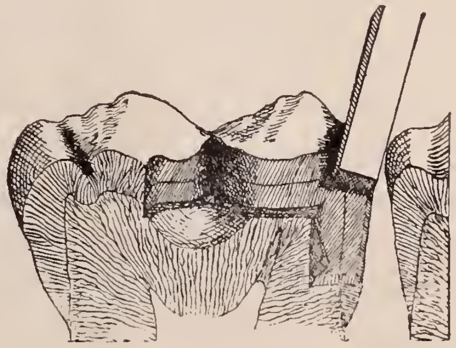


Fig. 13

Fig. 12. The occlusal portion of the enamel wall of the cavity has been trimmed to form with the chisels and enamel hatchets, and the cavity having been made fit for immediate sealing with gutta-percha in case the pulp should be found exposed, the decayed material has been removed with spoons 20-9-12. A ledge is cut around the cavity in the occlusal portion for the reason that the depth of this is found to be so great as to seriously endanger the exposure of the pulp if this were squared up to the full depth. The enamel hatchet is in position cutting the enamel of the gingival wall farther gingivally.—*G. V. Black's Oper. Den.*

Fig. 13. The chisel cutting the buccal wall, extending it farther buccally.—*G. V. Black's Oper. Den.*

cavity is governed by the extent of decay, excepting that it should be sufficiently deep in the dentin to give sufficient strength to the filling material. It must be remembered that all angles of the cavity in enamel should be rounded and all angles in dentin should be definite and sharp. Also that all cavo-surface angles of enamel walls should be so beveled as to remove any unsupported ends of enamel rods. (See Figs. 13, 14 and 15.)

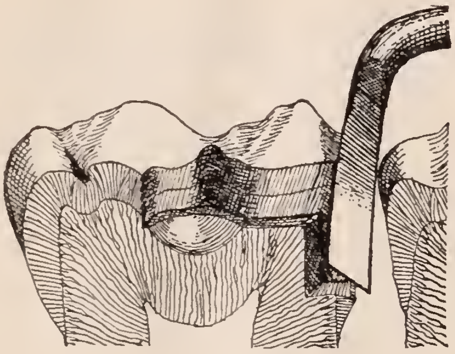


Fig. 14

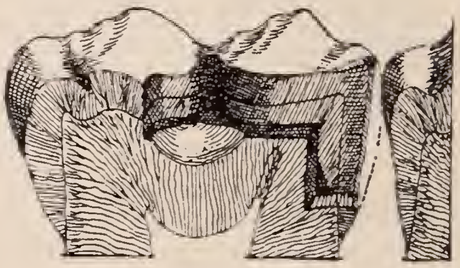


Fig. 15

Fig. 14. The gingival margin trimmer in position, giving a slight bevel to the gingival cavo-surface angle. Notice particularly the angle of the cutting edge of this instrument and its adaptation to this work. The pair of gingival margin trimmers designed for use in distal cavities serve equally well for that position.—*G. V. Black's Oper. Den.*

Fig. 15. The finished cavity. Note in this the rounding about the mesio-buccal cusp, avoiding cutting the recessional line of the pulpal horn. The length of the mesio-buccal horn of the pulp is always an unsolved problem until it is exposed.—*G. V. Black's Oper. Den.*

The retention of this filling is the next thing to be considered. The greatest stress upon this filling comes from occlusion with the opposing teeth. The flat gingival wall meets this requirement. The next greatest stress to be overcome is the tipping of the filling toward the mesial. It is not possible to gain sufficient anchorage by undercutting the buccal and lingual enamel plates to withstand this stress without weakening them. It is therefore necessary to resort to another form of anchorage. The ideal method is to cut what is termed a step with walls parallel or somewhat dovetailed in form in the occlusal portion of this tooth. This is usually the first place where I would use the engine and bur. (See Fig. 11.) With a small inverted cone bur, not larger than one millimeter, placed at the dento-enamel junction, I would cut a narrow slot in the enamel, following along the mesial groove and extending to the central pit. This cutting is done by drawing the bur from within outward. The enamel is now undermined with the inverted cone bur and can be readily chipped away with a millimeter straight chisel. This process is continued until the desired extent and shape of the step portion is outlined.

The buccal, lingual and distal walls of this step are all made parallel to the long axis of the tooth. The floor of this step portion is made at right angles to the length of the tooth and is placed sufficiently deep in the dentin to withstand the stress of the occlusion. For a gold filling no other form of retention is necessary. However, a groove may be made with a small inverted cone bur in the angles of the step portion with the buccal and lingual walls, and a small amount of retention may be placed in the point angles of the mesial portion of the cavity. The preparation would be the same for amalgam, using the small retention grooves just mentioned.

The width of the occlusal step will be governed by the depth of the cavity and the amount of filling exposed and the stress it must bear. There are patients whose bite is so strong, and they use their teeth so vigorously, that we need all the strength of material it is possible to obtain without weakening the tooth structure. There are other patients whose bite is weak, and it is only necessary to provide a limited amount of strength. There is a danger in preparing this step that should be familiar to all operators. In the development of the dentin in the tooth, the horns of the pulp recede from the enamel cap from a point corresponding to the point of the cusps toward the horns of the pulp and in this development of the dentin it frequently happens that small fibers of the pulp still remain running parallel to these lines. These lines are known as the recessional lines of the pulpal horn. We must study tooth development and know the location of these lines. (See Fig. 1.) A great percentage of the accidental pulp exposures are made because operators did not take these recessional lines into consideration. The final preparation of this cavity should always be made with the rubber dam in place and the tooth thoroughly dry. Unless the dam is placed, and the tooth thoroughly dry, we are almost sure to overlook the whitened areas of decay, especially to the gingival. This in itself may mean success or failure of a filling.

## EXTENSION FOR PREVENTION

Extension for prevention is not well understood, and I want to try and correct some of the misconceptions of these principles. Extension for prevention was unfortunate because it gave opportunity for misunderstanding. With some it implies that the more one cuts the less opportunity for recurrence of decay. This is wrong. While certain directions or rules as to principles can be given that are absolutely definite, yet one cannot give anything definite so far as measurements are concerned. In other words, if you should hand me an extracted molar tooth and ask me to outline just where a cavity on the mesial should be extended, I could not tell you. One must judge by the conditions met with in that individual mouth. Extension for prevention means the establishing of a condition of immunity to decay on a given surface or a condition that practically prevents the recurrence of decay on that surface. Cavities in some cases may be narrow and others may be wide; some teeth may be separated and the filling built out abnormally so that a comparatively narrow cavity will establish a condition of immunity to decay just as well as if a wide cavity had been cut and the filling built to the normal tooth form. The point here is to obliterate the area of liability by cutting to a place where the excursion of food in mastication keeps the line of the enamel margin clean and not cut beyond this. In teaching this subject I have found men do not always grasp these principles. Many of the questions show most conclusively that the student or dentist does not understand the value of form. Extension has no reference to caries of dentin. Extending cavities to include weak walls is not extension for prevention, for in many cases the operator is carrying the cavity walls to a part of the tooth that is not kept as clean as the angles. Worn contacts must be taken into consideration when preparing cavities. In many cases this wear has resulted in a number of lost or much flattened contacts, and it is frequently possible to cause a number of these teeth to regain normal contact as the result of one filling. (See Figs. 16-17.) There is no one thing in operative dentistry more important than establishing and maintaining normal contact.

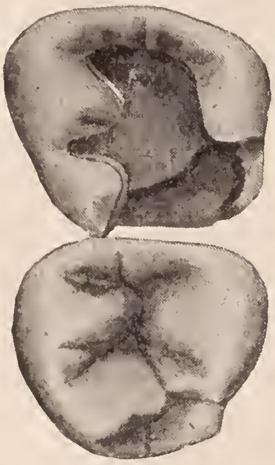


Fig. 16

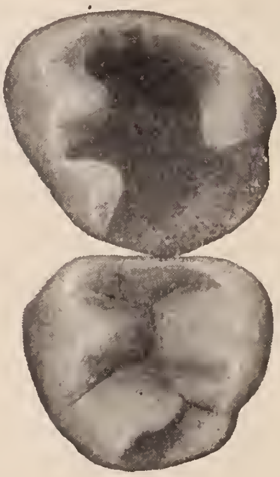


Fig. 17

Fig. 16. Upper first and second molars, showing a disto-occlusal cavity in the first molar. The contact is very broad and close. The teeth are large, angular and strong.—*G. V. Black's Oper. Den.*

Fig. 17. The case after the filling is completed. After the cavity has been roughly prepared and it has been found that the pulp will not be exposed, some time is taken in separating the teeth. Notice that in Fig. 16 the bucco-distal angle, as prepared, is in contact with the second molar, the surface of which is very flat. Then compare this with the relation of this angle to the second molar in Fig. 17, which shows the separation and the use of the prominent contact point.—*G. V. Black's Oper. Den.*

To sum it up, one must have a fund of detailed information on the various subjects and then put all of that knowledge into practice, combined with a thorough technical skill. As an example of this detail, if one fails to recognize the importance of the dento-enamel junction, that in itself is often sufficient to cause absolute failure even though every other detail of the cavity preparation may have been thoroughly done. If one does not recognize the difference in the method of attack and progress of caries in a buccal pit in a lower molar as compared with the gingival third cavity on the same surface, his cavities can hardly be successfully prepared and of course his failures must be many.

There is no one thing in cavity preparation that needs emphasizing more than the possibilities of the use of inlays instead of crowns. If the cast inlay had no other place in dentistry, this would be sufficient to stamp it as one of the great inventions. There can be no doubt in the minds of observing dentists that crowns are used altogether too much and that they are responsible for a large share of the irritated and inflamed gums. I know that, in the vast majority of cases, inlays or amalgam fillings would serve the patients far better. The cavity preparation for inlays differs only slightly from the ordinary preparation for gold or amalgam. Instead of having the walls parallel, all walls must diverge slightly toward the outer part of the cavity. No undercuts of any description should be used in inlay cavities. Before the advent of the present inlay method there was a certain variety of cavity that gave us a great deal of trouble, but since the inlay method has been perfected we are able to do better for most of these teeth without crowning. I refer to badly decayed upper bicuspids in which the pulps have been removed. (See Figs. 18-22.) After the cutting of the dentin necessary for the removal of the pulps, in addition to the large cavities on both mesial and distal surfaces, we find these teeth badly weakened and there is danger of the buccal or lingual plate being unable to withstand the stress of mastication. In these cases the cavity should be extended over on the buccal and lingual surfaces so that the stress of mastication will come on the filling and not on the buccal or lingual plates of enamel. This

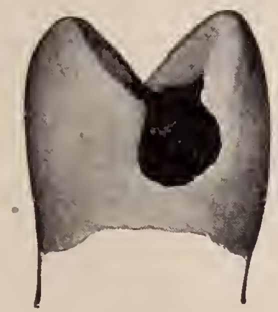


Fig. 18

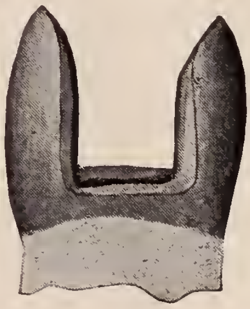


Fig. 19

Fig. 18. Distal and mesial views of the first bicuspid, showing the decays. Examination reveals extensive exposure of the pulp, which must be removed.—*G. V. Black's Oper. Den.*

Fig. 19. The prepared cavity. Notice that the enamel has been cut away just over the points of the cusps.—*G. V. Black's Oper. Den.*

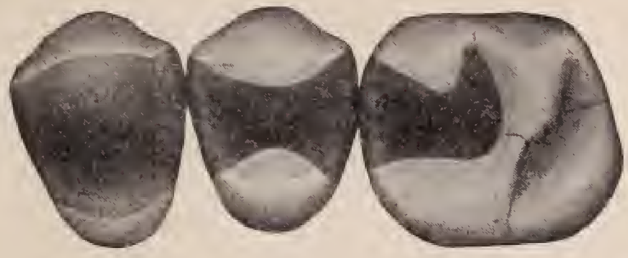


Fig. 20

The cavity filled. Notice that the filling material protects the entire occlusal surface so that the danger of the cusps being split off by the wedging of food between them is removed.—*G. V. Black's Oper. Den.*

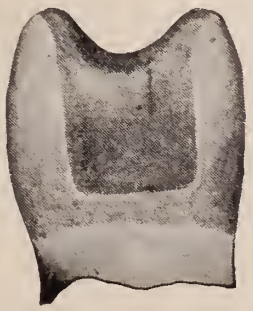


Fig. 21

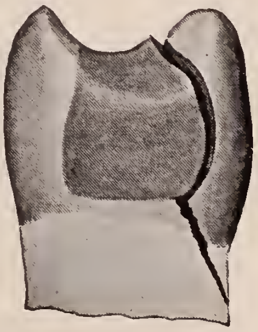


Fig. 22

The finished case as seen from the occlusal view.—*G. V. Black's Oper. Den.*

This exhibits the usual result of a filling placed in mesio-occluso-distal cavities after the tooth has been weakened by the removal of the pulp. This unfortunate accident is pretty sure to occur, sooner or later, from the wedging of food between the cusps.—*G. V. Black's Oper. Den.*

is not extension for prevention, it is done to prevent the possibilities of an unfortunate accident; it is simply cutting away part of a weakened wall, thereby making it very much stronger.

If I have made myself plain, you have recognized that I am pleading for higher average skill and for added compensation to the average dentist. I make the claim that if we will do our duty towards our patients, when they place themselves in our care as most of them do, that we should have fewer of these very large fillings, comparatively few crowns, and the loss of teeth should be materially lessened. I know that the average dentist is putting in too many hours per day at the chair and too few hours in reading, studying and in investigating and writing. In fact, some have to work so many of their hours that they think that they cannot afford to attend their state and local dental meetings. For this reason, I am pleading for fees—notice that it is just plain fees—so that this average man can put in a certain amount of time advancing himself in his work. I know that the component societies in Illinois have taken up the fee question and have generally increased their fees. This has resulted in a better grade of dentistry.

I cannot close without calling attention, especially to the younger men, to the wonderful opportunities that are open to the progressive dentist. There is a dental awakening of the public that is sweeping over the entire country and our people are giving more and more attention to their teeth. Many of the dental societies are playing an important part in this movement, educating the public through the press and by public free lectures, etc. The demand for high-grade dentistry, which is now greater than the supply, will increase with great rapidity.

I take it that conditions are not wonderfully different in Ohio from what we find in Illinois. Those of you who have had programs to prepare and clinics to obtain know too well that it is often an extremely difficult thing to secure the necessary essayists and clinicians. We should all be willing to do our part in advancing the profession. Every man has talents and it only remains for him to discover himself and do his part.

What we need most today is more workers—men who are willing to go out and spread not only this gospel of scientific cavity preparation, but scores of other things that will help to make men better dentists so that we can diminish this large percentage of failures and save many more teeth.

## DISCUSSION

Dr. L. L. Barber, Toledo: First of all I want to thank Dr. Gethro for his most excellent paper on a subject that has been talked about since time immemorial. It is a subject upon which most men would hesitate to give a paper. Dr. Gethro, in my judgment, has handled this subject as very few men could do. In the reasons that he gives for the improper preparation of cavities, I think he has well placed the proper one in the proper place. I think he says that the main reason is because dentists do not care to take the time. I do not exactly know how he put it. I believe that today there are but very few people who come from a dental college who do not know the fundamental principles of the preparation of a cavity, or at least they have been taught them.

Whether they know them or not I cannot say, but it has been my observation, and I have been some few years in the practice of dentistry, that there are mighty few cavities that are prepared according to mechanical principles that are at all right. Why dentists do this I have made it my business to try and find out. There are various reasons. In different sections of the country, for instance, they have been taught somewhat differently. The Eastern people, I believe, have not had the amount of teaching tending towards the opening up of cavities that the Western people have had. I believe that is true, but another thing enters into the proposition, and that is the fact that so many dentists believe that if they open up an approximal cavity and make it a little broader and all that sort of thing, it not only takes more material but it takes more time to fill it. It is true that it takes slightly more material, probably one or two or two and one-half sheets of metal more, I don't know how much, very little anyway; but the idea that it takes longer to fill that sort of a cavity is a mistake. If you have a cavity properly prepared, as Dr. Gethro has explained here, any man, when he becomes at all familiar with that sort of preparation, will fill that cavity much quicker than he will a cavity where they try to tuck gold in under cuts, not having the cavity well opened up, so I believe that this enters into it as well as the reason that Dr. Gethro put first, that is to say, the fees, etc., and the time required.

Dentists have said to me that "you could not prepare cavities and finish fillings that way and make a living in my part of the country." That, of course, is up to the individual, almost entirely, especially now. I know men in small places, very small places, that get excellent fees, that is, by comparison with what dentists as a rule get. Now, you know I would rather get more for the work I did and have more time to play golf. I do not know how you get along in working ten, twelve or fourteen hours a day. If I work six I think I have done all I can do. It is this working all day and half the night, filling half prepared cavities, that kills; there is nothing to it, and in so doing you cannot give your patient the best service, and if you do not give them good service you cannot get them to pay good fees. I believe it is up to the dentists, as a class, to think more of their duty to the patient and then charge what it is worth, and not let the people run our business instead of running it ourselves. The people will not place any higher estimate upon our time than we place upon it ourselves, so that if we do not they certainly will not. But mind, we cannot over-estimate and charge and hope to last.

I want to ask Dr. Gethro a question, and that is whether he would make his contact-point in the restoration of a tooth as narrow in teeth that are worn down to almost nothing as he would in one of normal shape. In my judgment, it is better to make them wider. Whether that is true or not I cannot say. I would like as well to ask him if he makes the contact-point practically in the same position for upper molars or bicuspids as he does for the lower. My experience is that the contact-point in the lower molars and bicuspids is more towards the lingual than it is in the upper. Whether that be true or not I cannot say. When I was in college we did not have dental anatomy taught as now. If we had much of my trouble would have been eliminated. I believe that it is not at all times necessary to make the cervical margin of your filling under the gum. I believe as a general proposition that it is good practice, but of course the man who gave us the so-called rules of extensions for prevention expected that we would use some sort of horse sense, and just because we should extend one cavity laterally very much, I take it, he did not mean that we should extend all cavities that way. If you make the cervical margin of your filling under the gum, and it is well done, you are absolutely sure that you are not going to have a recurrence of decay at that point. But there are teeth and conditions which do not require the cutting of teeth to the extent of going under the gum margin that I take it is understood. Another thing is, the enamel wall, whether you make that enamel wall square or whether you round or bevel it, I should prefer to bevel and make it square in the dentine. I am not sure but that is what is meant.

"I firmly believe that if cavities were properly prepared and fillings inserted on a par with this correct preparation, that it would prevent a large portion of the diseases of the gums.'' If we would leave out some of the crowns and that sort of thing I believe it would be better. It is abominable the gold crowns that I come in contact with, and I think it is a travesty on our profession that they should be put in in the haphazard way that they are without any regard to where or how it is being done. Some just put on gold crowns and put them under the gum, a sixteenth of an inch in some places and one thirty-second of an inch in other places, and not where they should be at all in other cases, and do not take into consideration the shape of the teeth, interproximal space, occlusion, or anything else, and think that is a panacea for everything that could happen to that tooth, and the public at large believe the same thing and believe it because the dentists have taught it. I believe those things are wrong. If we cannot take a little time to try to educate the people, without hope of direct monetary compensation for it, then we better get out of the profession, and he who does not stand for these principles is God's miscreant and my enemy.

Another thing is, somebody was telling me today that a patient will pay $25.00 for a spring hat and then want to pay only $6.00 for a plate of four teeth. The matter is very largely up to the dentist, not the people. They believe what we tell them very largely, and do what we tell them if we believe it ourselves; if we do not believe what we tell them, then do not expect *them* to. The doctor has covered the ground pretty thoroughly here, and, it being a stereopticon lecture, it is hard to add anything.

But I wish to speak of another thing (it is not exactly pertinent to the question), and that is the number of amalgam fillings that dentists put in and never seem to pay any attention to the dressing away of the cervical margin of the fillings. It is just as sure to make trouble there as that two and two make four, and it is just as easy to take that off when your filling has been in ten or fifteen minutes as it is to take the cement off from your cement slab when you are through and to leave it there in absolute carelessness, and nothing else, and will be one more reason why your patients won't pay such good prices for work.

The preparation of the cavity is absolutely important. The doctor has given us directions for the preparation where decay has progressed only about so far. Now, of course, there are any number of cases that go beyond, where it is possible to make this ideal preparation. I want to ask the doctor if he ever strengthens walls with cement and that sort of thing and afterwards puts in gold. I would also like to ask the doctor if I understood him to say that he prepared his cavities exactly alike for amalgam and gold fillings. I am not sure whether I understood him to say that or not. I want to ask him if it is not a fact that in many cases the placing of one or two approximal fillings may correct a very bad condition between teeth—probably molars and bicuspids—that are not decayed at all. I have seen teeth where I have found pyorrhea and where the tooth so affected did not have the cavity, but with some other tooth having the cavity so long that it allowed the other teeth to move and you have that bad condition, where if you will pack that with gutta percha and push those teeth back where they belong, getting a contact with the teeth that have never been filled and then get a proper contour to that one tooth, you will correct the trouble without difficulty.

Dr. H. M. Semans, Columbus: Let me spend a second or two to throw bouquets at the essayist. I feel much inclined to do so, and so I will invite him to come up here to the table and take his choice of these posies—that is the way I feel about it, doctor.

Dr. Gethro, at the commencement of his paper, referred to the fact that we, as dentists, should be teachers, and Dr. Barber referred to the fact that we, as dentists, have been teachers, Dr. Gethro meaning, of course, that we, as dentists, should be teachers in the right direction, and Dr. Barber that we, as teachers, have been teaching our patients, to a great extent, in the wrong direction; and I want to say that they are both right. Dr. Barber is right. We, as dentists, either by our silence or by the fact that we have been and are careless in our methods of procedure and then by our silence, give sanction to the fact that we are high-class dentists, and so they go away with that impression, that whatever is put there is all right—"because my dentist did it." Now, that is teaching entirely in a wrong direction, and of course we all realize that.

Dr. Gethro says in his paper that we must be teachers of our patients. Now, then, if we are going to be teachers of our patients in the right way, the only way to do it is to do the work in the right way. I don't see how we can teach and give utterance to our teaching without doing our work in the right way. If we are silent as to our work, I really believe then that the silence itself is begetting carelessness, and if we are talking about the work, and explaining the work, I believe it is going to hold us up to good work; so I heartily agree with Dr. Gethro's idea that we should be teachers of our patients.

Now, as to the terrible neglect of the cervical portion of the enamel of the approximal cavities, especially in amalgam fillings in cavity preparation. I believe that one of the reasons, perhaps the greatest reason, is because in 995 out of every 1,000 cavities, when made for amalgam fillings, are prepared wet, and then dried. And why dried? Why, only to fill, not to examine. I see a man yonder, looking at me now, who uses a jeweler's glass to examine cavities. I wonder how many do that, or use their eyes to make an examination in so careful a way. Now, as I say, almost all cavities that are prepared for amalgam fillings are prepared wet. That may be all right if the dentist will carry on the work after that in a dry—in a dessicated condition—one in which everything in there will blanch out so that especially the whitened appearance of decayed enamel will show up. Blow in some hot air and then surprise yourself with the fact that in almost every case—I might say every case—you are able to detect a defective enamel. Then another reason why that portion of the enamel is so terribly neglected is because the operator depends upon burs, and not chisels.

In speaking about the contact points, representing them as the coming together of two marbles, the essayist sounds a warning note. I thoroughly believe his statement, and I want to say that I have had the same experience that probably all of you have had, that it is a mighty hard proposition to finish a filling so that it will present such a condition. We so often flatten the contact-point when finishing work, and it is something that we should be careful to avoid in finishing a filling.

In speaking about chisels and the proper use of them, I hope you all noticed that every time Dr. Gethro referred to the use of the chisel he said a sharp, or sharpened chisel. Now, I would like to emphasize the second word, a *sharpened* chisel. While he was talking about it, it seemed to me that it was just a year or so ago that he himself was down here, and some of you may remember that he said, as he went about the country and went into dentists' offices, he would feel of the chisels and his hands were not injured when he would press upon the edge of the chisels, because they were not sharp. Our tendency is to use the chisel, week in and week out, without using the stone that we bought when students, back some few years more or less. I venture to say that many stones in the offices today are just as clean and bright as the day they were bought.

Now, in hand instrumentation, Dr. Gethro referred to the use of a certain kind of an instrument because it inclined at the 25° or 23° inclination, and that as you passed in under the enamel in occlusal cavities you would detect whether the decay is extended a certain direction or not. Right here, again, is where we are amiss in the fact that we depend upon burs so much. There are offices throughout the country where they do not know what a chisel is. Our students come into the colleges and, having been told to buy these instruments, they buy them and are made to use them. Very often dentists not connected with colleges tell them to go ahead and buy them, as they cannot help themselves, but that when they go out into dental practice they will throw them away in some obscure corner and that will be the end of them. Perhaps it is not so bad as that now, however, because there is a general awakening all along the line and has been for the last ten years, ever since Dr. Black got at the proper method of using hand instruments. I would like to ask Dr. Gethro about two or three of the slides that he had thrown on the screen; where he wished to avoid a certain amount of extension and depended upon separation. Now, I may have got the wrong idea, but I got the idea that the contact-point itself is changed, from near the buccal portion of the abrasure, over to the lingual portion.

Dr. C. R. Butler, Cleveland: In the first place I want to say that there has not been a presentation to this body covering the question of operative dentistry or the filling of teeth, with gold or any other material, so nicely and in such concise form and the usage of the nomenclature that we could all understand it as this. I asked a question or two in regard to his millimeters or pyrometers, or whatever they might be, as compared with one-sixteenth or one-eighth of an inch. He just simply told us it was one twenty-fifth of an inch, so that we all understand it. I think I am on record for saying something in regard to too much machinery being used, and I am very glad that Dr. Gethro should put such emphasis upon the value of the chisel in the preparation of the cavity, especially the enamel margin. And then, another thing, he gave an illustration of the importance of using an instrument of such form as to go down and sweep out the cavity and take out the decay, and stated that it is done quicker and with less pain. There are very few men today that are sent out from the colleges that are taught the importance of developing their skill in using and handling chisels. The engine, instead of being used as a valuable accessory, is abused. It is used to excess in excavating all cavities, and that is another thing. Mention was made that if you want to open a cavity put the bur in, cut out instead of cutting inward if you want to cut away the enamel, but the most efficient and rapid way for the removal of enamel is the chisel, and a sharp one at that. The reason that the students are using the engine to excess is that they are not taught to use cutting with hand instruments to such an extent as will develop their power to cut with precision. I know the time is passing and I know that this subject is one of great importance. What are we doing every day? Are we putting in saving fillings or are we putting them in just simply for the dollars?

Dr. W. A. Siddall, Cleveland: In cutting the step in a mesio-occlusal cavity in a bicuspid or molar, it may be all right to cut through with a little inverted cone bur, but the dentin under the enamel at that point is usually very sensitive, and I think that a small square-edged stone, as Dr. Callahan says, often in an obtuse angle hand-piece will cut the enamel down to the dentin very quickly and easily. The dove-tailed part can very nicely be cut with a square-ended cross-cut bur. Often in such cavity preparation we see a deep slot cut when it would be much better, in my opinion, to cut a wider slot and not so deep, perhaps just going through the enamel.

Dr. S. D. Ruggles, Portsmouth: During the past summer it was my privilege to take a post-graduate course at the Northwestern University, where Dr. Gethro teaches the methods advocated in his lecture. After all is said, the fact remains that most of our time is devoted to repairs caused by caries, therefore the necessity for system and accuracy in cavity preparation is very obvious.

The nomenclature used today is not so familiar to many of us as it should be in order to follow closely the various steps mentioned, but the time is fast approaching when it will.

In order to do anything intelligently the mind should be able to clearly analyze the various steps necessary to bring about the finished result. Until dentists have mastered the necessary steps of cavity preparation in their respective order, the great waste of time and discomfort to the patient will continue to be one of the great drawbacks to dental operations.

All cavities of whatever class have a definite outline form, which should be obtained first. Then the resistance to which a filling is subjected will decide its formation from that standpoint.

Following this you should decide what retention will be needed to best withstand this stress and shape the angles accordingly. It frequently happens that for the sake of convenience in operating, slight modifications are necessary to facilitate your operating to advantage, and its outline is made to suit your purpose.

Now the cavity should be entirely freed from carious tissue and the enamel walls beveled. After the cavity is freed from chips and dust by brushing with dry cotton or spunk the filling may be placed. These steps are easily mastered and will save time and energy for both patient and operator.

DR. GETHRO (closing): In closing the discussion and answering the several questions brought up by the preceding speakers, I shall be as brief as possible.

Dr. Barber asked about the width of the contact point. In answering that question, I will say that in all cases the contact point should be made as narrow as possible, the narrower the better. Perhaps it will add to what I have presented to say, that the contact point in gold foil fillings should be made as hard as it is possible to māke them. In gold inlays, it is always advisable to form the contact by flowing solder at that point. In both cases we are trying to prevent the loss of the narrow contact by wear, due to the movement of the teeth in their sockets. This interproximal wear accounts for the loss of many contacts and the subsequent diseases of the soft tissues surrounding the teeth. It frequently happens that we can restore normal contact in several teeth by placing one proximal filling.

In answering the question about the position of the contact points of the upper molars and bicuspids, as compared to the same lower teeth, the contacts occupy about the same relative positions with the exception of the contact formed by the lower second molar. In the lower second molar we find the contact about half way from buccal to lingual. We may also find a similar condition in the upper second molar. In well-formed arches all the contacts will be to the buccal with the exception of the second molars.

A question was asked whether the preparation of a cavity for gold foil and amalgam would be the same. They would be identical, with the exception that, for a gold foil filling the small retention or convenience grooves mentioned would be unnecessary. Nothing more than parallel walls is necessary for a gold filling.

Dr. Semans asked if, in the slides shown, the contact point had been changed from the buccal embrasure to the lingual embrasure in the cases where the teeth were separated and the contacts exaggerated. In these cases, where the cavity is narrow bucco-lingually and we desire to build out the filling beyond the normal contour, it is necessary to have the contact point near the center of the filling, and this usually brings it near the center of the tooth bucco-lingually.

In closing, I desire to express my full appreciation for the splendid treatment given me by the officers and members of the Ohio State Dental Society, and to those who have taken part in the discussion.

The inner side of every cloud is bright and shining.
I therefore turn my clouds about
And always wear them inside out
To show the lining. —Ellen Thorneycroft Fowler.

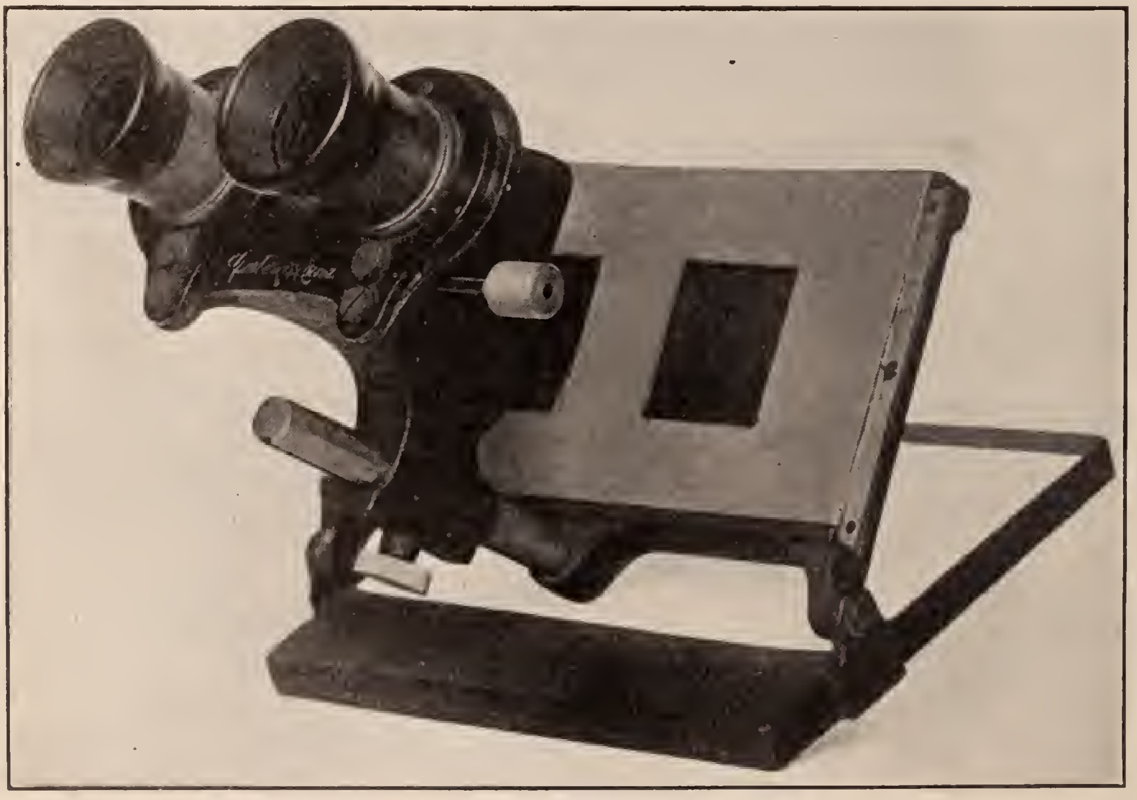
# STEREOSCOPIC RADIOGRAMS OF THE TEETH AND A SIMPLE MEANS OF PRODUCING THEM

BY E. BALLARD LODGE, D.D.S., CLEVELAND, OHIO

IN THE February issue of The Dental Summary, of the year 1905, there appeared an article by the writer regarding stereoscopic views of the teeth. At that time pictures were produced by what seemed then to be by a method the simplest attainable to get good results.

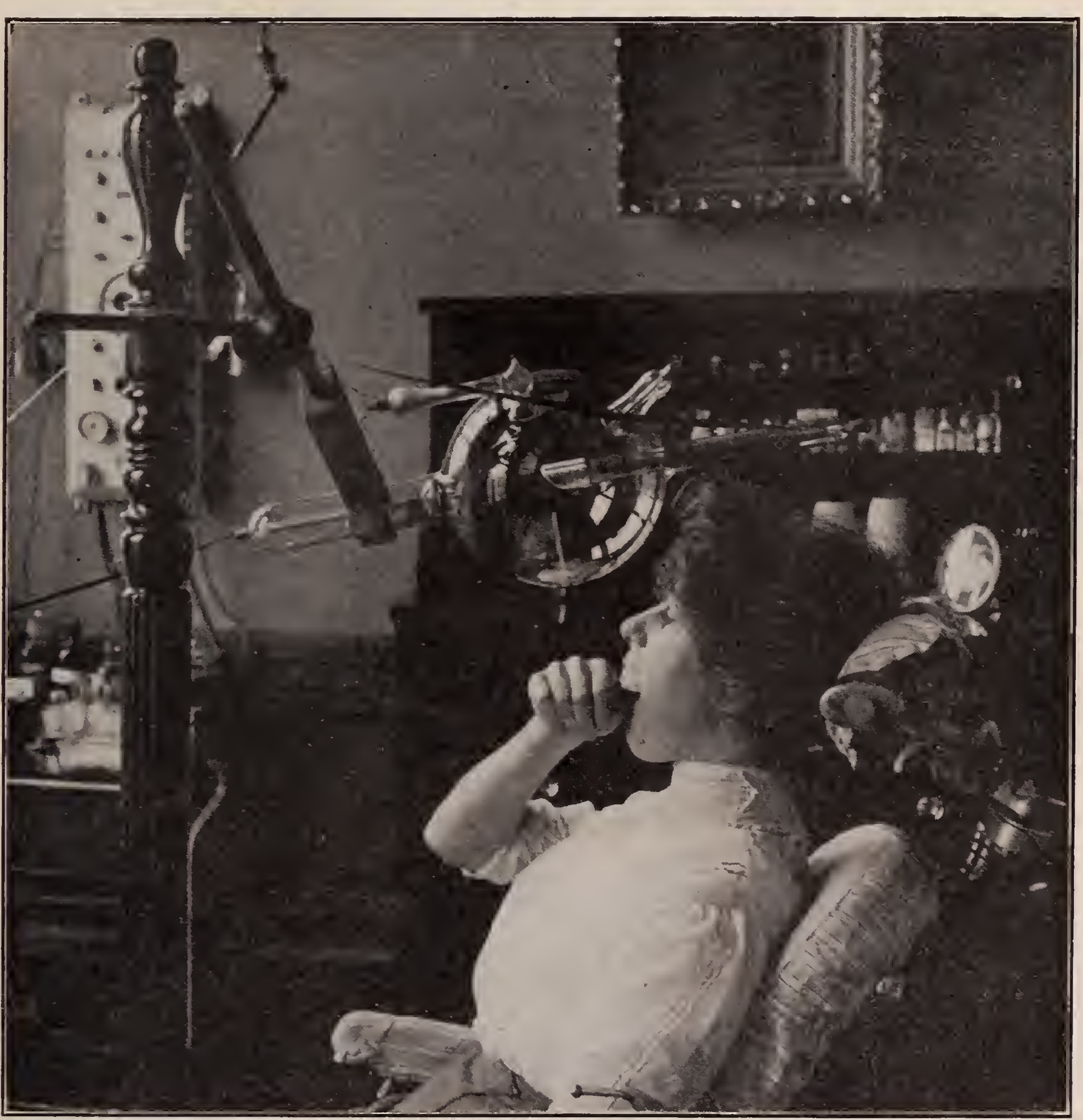
Recently, however, a method has been evolved by the writer which still further simplifies the process and makes it at the same time equally accurate. The method is as follows:

Let us suppose, for the sake of illustration, that we desire to ascertain the relative position of an upper, left, unerupted cuspid. The plain skiagraph will show that such a tooth is present in the arch, but the dentist desires to know whether it is labially or lingually placed with reference to the incisor root.



This, in the absence of ocular evidence and with a plain radiogram only, it is impossible to tell. A modern dental chair is found best for dental radiography because it can be readily raised, lowered, rotated, etc. The Crookes' tube is focused as would be the case for a plain picture at say ten inches from the anode to the teeth. An exposure is then made; the patient's head is turned a definite number of degrees and a second exposure is made, and this without moving the tube from its original position. By stereoscopic views we mean two images of the object differing only in such respects as the two varying positions of the eyes behold the object. These two views, being blended when seen together, give the effect of binocular vision and convey to the mind the idea of form and perspective.

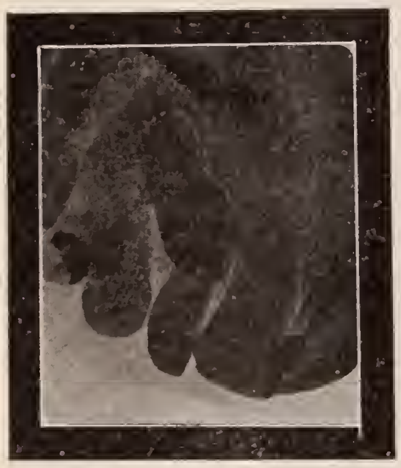
Now, for our purpose, it is not necessary that we know just the number of degrees that the patient be made to turn the head, but it is essential for scientific work that things be worked out in mathematical fashion. If it is true that the pupils of the eyes on the average are two and a half inches apart and if it is also true that a distance of ten inches is employed, calculating from anode to teeth in making these radiograms, it then becomes important that we employ proportional values in the determination of positions for stereoscopic pictures.



It so happens that in the writer's office the left hand side of one of the operating windows comes directly in front of the patient, and is five feet away. By placing a stick fifteen inches in length in a horizontal position, with its center on the window frame, it makes a convenient means of getting correct views. Fifteen inches is arrived at as the base line of an isosceles triangle similar to the one made upon the two and one-half inch base and the two equal sides of ten inches, as seen in the simple proportion:

2.5 : 10 :: X : 60=15.

It now becomes clear that two views, obtained first with the patient's face directed toward the left end of the stick for one exposure and toward the right end of the same for the second exposure, we shall have pictures which, when properly mounted, will serve for stereoscopic views. To accomplish this practically and with a sufficient degree of accuracy it is necessary to have some suitable object over which to sight, and for this purpose the writer has made use of a full-length lead pencil slipped through the hair over the median line. For persons with little or no hair, a ribbon may be placed around the head well up on the forehead. An elastic band is the most convenient. From this a string is extended in a straight line and in an antero-posterior direction over the median line. The string is to serve the same purpose as the lead pencil.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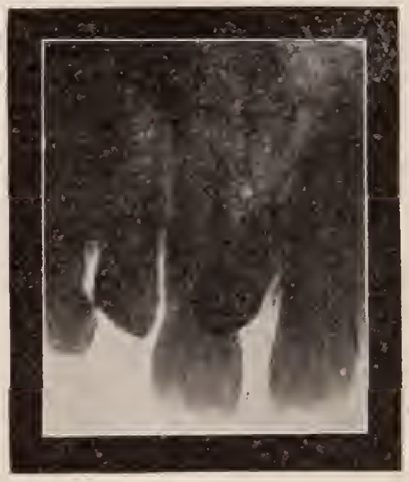
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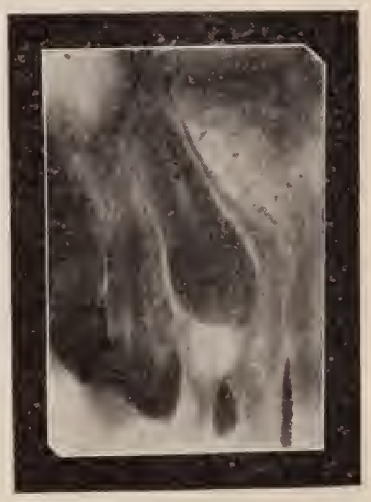
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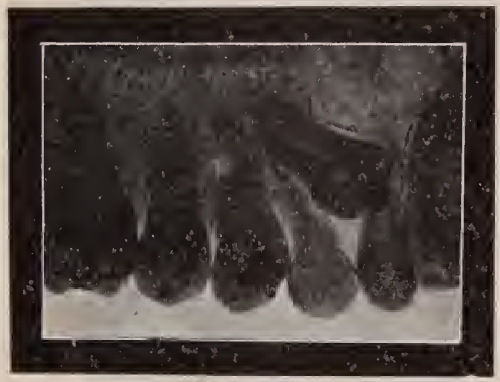
In making these pictures, then, the operator, having focussed the tube upon the teeth in question and having placed the film in the patient's mouth in its proper position, stands behind the chair, takes the head in the two hands and so places it against the head-rest that the pencil or string points to the left end of the stick. The first exposure is then made, the film removed. and without the patient being permitted to change his position the second film is substituted for the first. The head is now turned so that the pencil points to the right end of the stick and a second picture is taken.

In the writer's X-ray practice, in all cases except infants, he has the patient to hold the film, having previously instructed him just how it is to be done. In case of the upper teeth the film is held by means of the thumb of the opposite hand, i. e., if the teeth of the left side are to be -X-rayed the patient uses the right thumb, and vice versa. In case of lower teeth the index finger is employed and the patient is requested to flex the finger and to place the side of the finger against the side of the film. This is to maintain the film in a perpendicular position.

When stereoscopic views are made as above described, one may think of the anode of the Crookes' tube as an eye, then in the first exposure, or the one in which case the patient's face is directed toward the left end of the stick, the anode would see, as it were, what an eye with power to see through opaque objects would see, it being the left of a pair of eyes. Upon turning the head the required number of degrees to the right, viz.: to the other end of the stick, the position is now such that the anode, in its capacity of an eye, would be able to behold what the right eye of such a pair would see. It is now necessary merely to mount the resultant stereograms in their proper register to study them in the stereoscope.

If the pictures are placed in the instrument in the order taken, i. e., the left hand one on the left and the right one on the right, then we will see the tissues as we would looking from without inward; but in case of the transposition of the films in such manner as to place the right one where the left should be and vice versa, then we will see the parts in the reverse order, or as if we looked from within the mouth outward, or the lingual side would appear toward the observer.

Prints of stereoscopic views may be examined in the stereoscope, but they are much less satisfactory than the original films or plates. These being examined by transmitted light, if well made, are truly delightful to study. One can look into the individual teeth, as it were, just as he would look through a tumbler. One doing this work finds himself quite fascinated with the beauty of the results, and it is to be wondered at that more dentists are not using the X-ray in their practice.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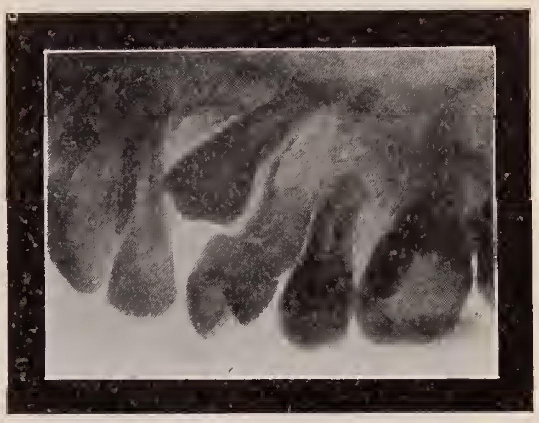
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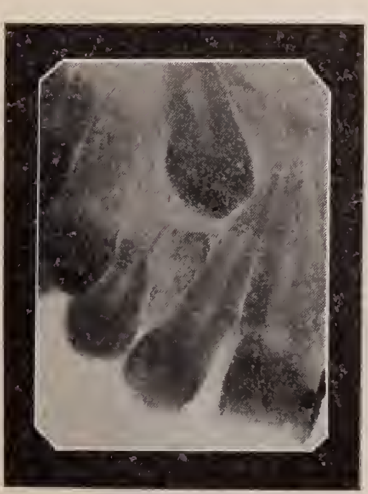
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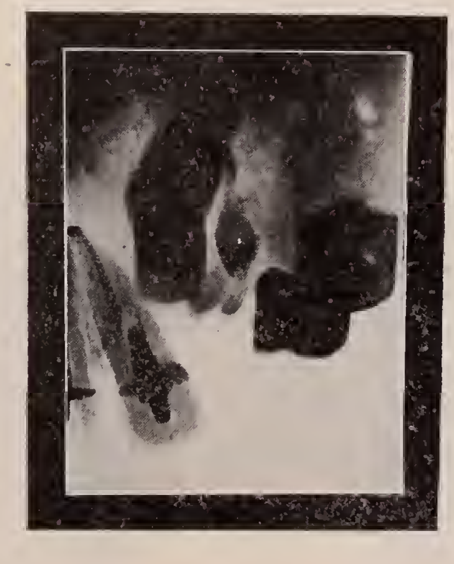
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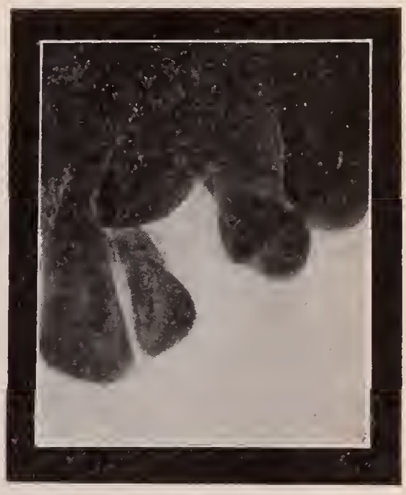
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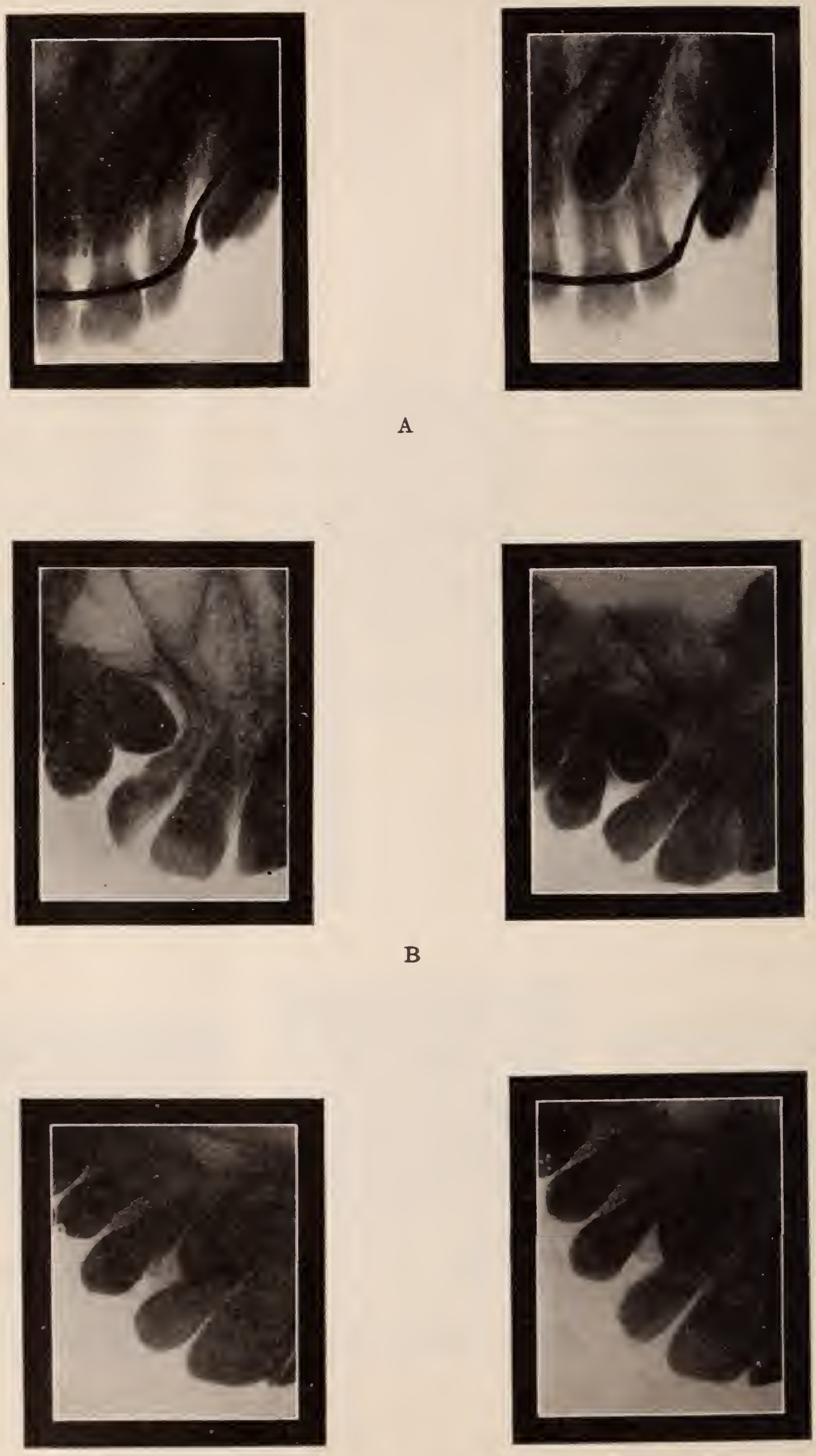
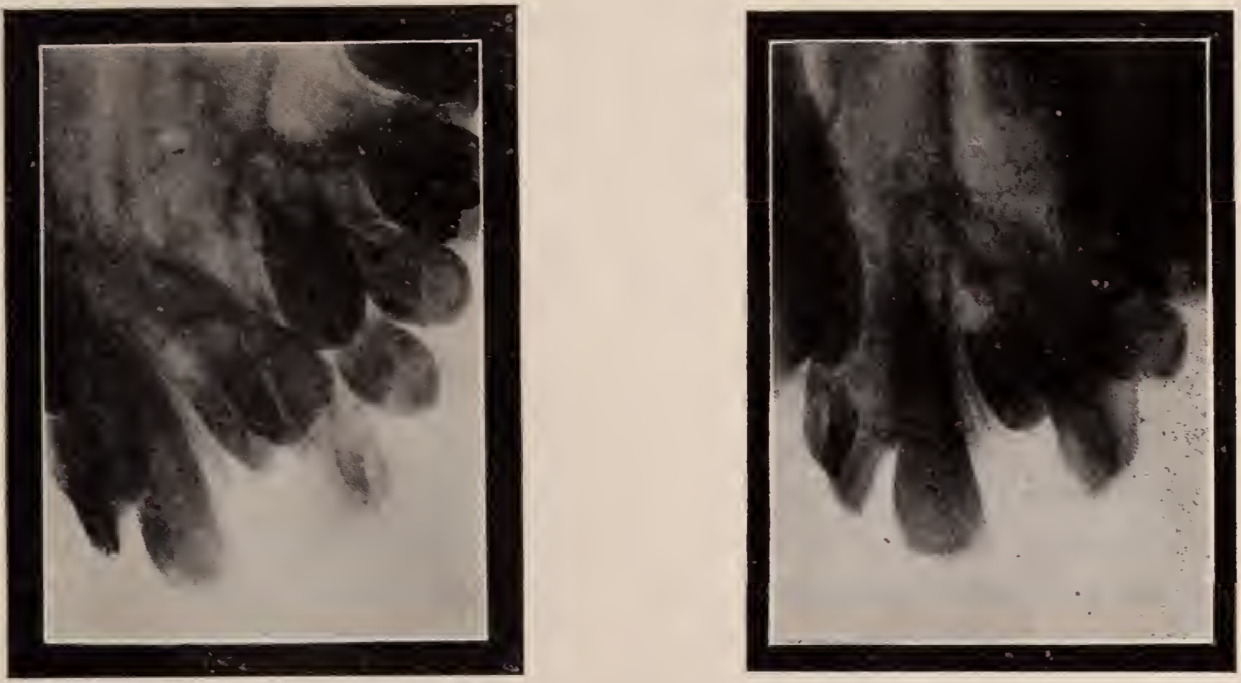
Prints numbered 1, 3, 4, 5, 6 and 8 show retarded cuspids. Number 2 shows a supernumerary between the centrals. Number 7 indicates a non-descended cuspid and a lateral incisor. To the distal of these are three tiny supernumeraries.

Misplaced and retarded teeth, similar to those here illustrated, are frequently the cause of crooked teeth when they present themselves in the way of developing roots



A, B and C represent three pairs of dental stereograms.

The plain shadow picture is, of course, truly marvelous, but carefully made stereograms of the dental tissues come so near to the ideal that little is left to be desired.



This pair of stereograms shows a retained and misdirected central, a cuspid and a supernumerary.

# BRIDGEWORK*

BY J. R. FOREMAN, D.D.S., CLINTON, MICH.

This is the Peeso method of removable bridgework, showing the telescopic molar and the tube and split-pin attachments.

A bridge of this kind is especially indicated in extensive restorations, in patients where a partial plate is undesirable, and where sufficient remuneration can be obtained. A full upper bridge, for instance, which can be removed occasionally by the patient and immersed in an alcoholic solution, which cuts all mucus and puts the piece in a sanitary condition that can scarcely be secured in a fixed bridge, is much more desirable than partial plates or fixed bridges.

The sanitary feature alone is worth the additional time it takes to construct such a piece, provided, of course, that the fee is in keeping with the service rendered, for it takes time to do this work.

The ease of repair is another important feature. Should a facing be broken the bridge can be taken to the laboratory and the facing ground in at the convenience of the operator.

Something might also be said about the repair of adjacent teeth, should this be necessary. The bridge can be removed and the teeth filled much more easily than with a fixed bridge.

There are many other important reasons why this is an ideal restoration.

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*Clinic Michigan State Dental Society, 1912.

# SPECIAL FEATURES IN CROWN AND BRIDGE WORK*

BY A. J. BUSH, D.D.S., COLUMBUS, OHIO

I HAVE here nearly all styles of construction of fixed bridgework, and am prepared to talk on crowns if you wish me to.

I prefer to start in on dowels and copings, because now-a-days we use dowel attachment pieces very largely for our fixed pieces. So, with your permission, I will first take up dowel attachment pieces, and, if time permits, answer all questions regarding the details and methods of construction of Goslee or Davis crown bridges, Twentieth Century or Logan, porcelain, etc.

It is very doubtful, however, as to the amount of ground that we can cover in fifteen or twenty minutes, but we will proceed as rapidly as possible and try to, at least, consider the most vital portions of fixed crown and bridge construction, namely, the dowel and coping. If I have any special feature to offer in crown and bridgework, you will find it in the one-piece method of making copings. There are three methods of making copings: 1st, the two-piece method; 2d, the one-piece method, and 3d, the casting method. The latter method, however, which at times possesses advantages that are invaluable in the management of certain cases, will not be considered at this time.

The two-piece coping is so called because the band and plate or floor are made out of separate pieces of metal and subsequently united with solder. This method then comprises three distinct operations: 1st, making the band; 2d, making the plate or floor, and 3d, uniting the two with solder.

The employment of this method of making copings demands two distinct operations in performing the operations of root preparations.

*First.* The preliminary basal root preparation in which the crown is left over length in order to obtain correct root measurement and the removing of the remaining enamel, which in this case is rendered comparatively difficult because of the great amount remaining.

*Second.* The obtaining of the final basal root preparation, after the measurement has been taken and the band partially completed, i. e., soldered, fitted and festooned.

Likewise, therefore, the making of the band is divided into two separate operations. First, the fitting and festooning of the band to root after the enamel has been removed and while the root is still over length; and second, the cutting or trimming of the band to correct width or length to come even with the margin of the root after the final basal root preparation has been obtained.

To the best of my knowledge this is the only procedure which offers reasonable possibilities for obtaining perfect results in making copings after this method, but the probabilities of obtaining poor results, according to my observations, are still greater than the possibilities of achieving success.

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*Clinic at Northern Ohio Dental Association.

The one-piece coping is so called because only one piece of metal is used in making it. I make practically all copings in this way, and I prefer this method for four reasons.

*First.* It is a method that offers the greatest possibilities of making a coping which will fit the root preparation perfectly, no matter how irregular, with very little trouble and effort.

*Second.* I like to use it because it permits me to get the correct basal root preparations at once, which greatly facilitates the removal of the remaining enamel in case a band is to be used.

*Third.* Since the coping is made in one piece, no soldering is necessary, and consequently no liability of unsoldering taking place in case of subsequent operations.

I like to use it, for the fourth reason, because it gives me a *routine method of making copings*, and I can follow the same routine regardless of the style of coping I am going to make, up to certain points, and the same thing may be said for root preparation. That is, if I intend to make a full band, I get the finished basal preparation at once, with enamel removed. If I am going to make a partial band, I get the finished basal preparation at once with the enamel removed only in location of band. If I omit the band entirely, and use a plate only, I get the finished basal preparation at once and leave the enamel on. I have made mention of three basal preparations for dowel crown attachments with copings, without describing them, and will not take the time to do so unless you request it, but of course each case demands certain mechanical considerations which should be recognized and observed, and the details of the preparation should not be executed until the operator can conceive a perfect mental picture of the superstructure and the requirements involved. At this time and before I commence the description of the one-piece coping, I want to go on record as opposed to the indiscriminate use of the bandless dowel crown for bridge abutments and the use of banded dowel crowns for single crown restorations.

In advising you to use full banded dowel crowns for bridge abutments, I am not afraid to assume the responsibility for the attachment, provided the band is properly made, but, while I am advising you to omit the band in single dowel crowns, I refuse to be held responsible for the success of such crowns unless the dowel used has length, size and strength enough to give it the dignity of the name.

In describing the one-piece coping I refer you to the chart. Figs. 1, 2 and 3, which are intended to graphically represent the root preparations and the various steps of construction for the three styles of coping, i. e., plate with band, plate with partial band, and plate without band.

Having completed the basal root preparation, we then enlarge the root canal to receive the dowel as in (a). Now, we do not enlarge the canal first and then select a dowel to fit the canal, but we select a dowel to suit the requirements of the case, then enlarge the canal to fit the dowel.

The dowel must fit the canal snugly. A loose fitting dowel will be ruinous to success in this method. In other words, the dowel should be held tightly.

The dowel should be square, and I always prefer to use platino-iridium, but gold clasp wire of the same shape may be used as a substitute in certain cases.

After these details have been attended to, we next select the coping material. Either pure gold or platinum plate, according to the case, and of such gauge as demanded by the requirements.

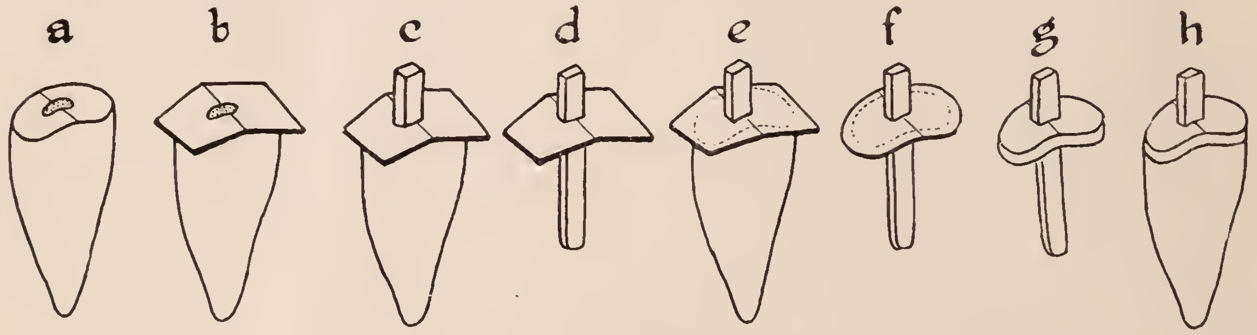

Fig. 1. Plate with band.

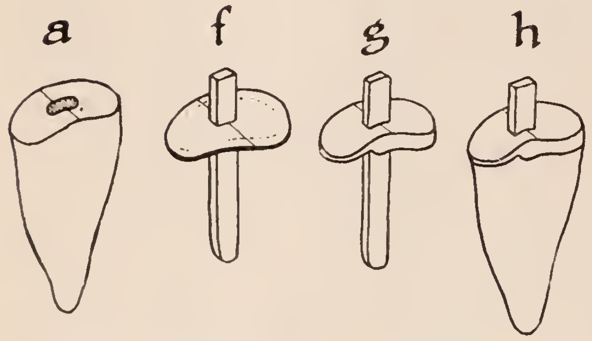

Fig. 2. Plate with partial band.

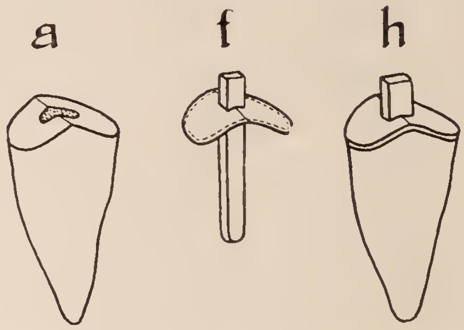

Fig. 3. Plate without band.

Now, then, we will cut a piece of the metal, selected to such dimensions as the case requires, as shown in (b) Fig. 1. Then roughly break it down on the basal surface of the root, and then, with an instrument, locate the canal opening; then perforate with pointed instrument and drive the dowel through the plate into the canal, letting the dowel make its own hole, as in (c). Remove the plate and dowel, as shown in (d), and solder. Put back on root and mallet to place. For this purpose I use smooth, flat-faced plugger points that I designated for the automatic. The plate should be malleted lightly until it is perfectly adapted to the base of the root, and, lastly, the plate should be malleted onto the margin of the root. This will give an outline of the root margin on the plate as shown in (e). Then remove and trim away surplus plate according to style of coping required as in (f), Figs. 1, 2 and 3.

If a full or partial band is required, a surplus should be left remaining equal to the width of band desired, as in (f), Fig. 1. This surplus may be turned down to form a perfect band by the use of special contouring pliers, as in (g). If necessary, the band may be perfected by malleting and burnishing directly upon and to the root, as shown in (h).

# SERVICE AND RECOMPENSE*

BY ROBT. A. CHATTIN, D.D.S.

IN THE advancement of all social, industrial and intellectual life there is ever present the fundamental principle of Man's Dependence. The fact, that man is dependent, gave origin to the varied industries that have developed and grown to such enormous proportions in the world of activity. Dependence is a perpetual call on humanity and no degree of knowledge attainable by man is able to set him above the want of assistance.

It is beautifully ordered that though the activities of the race in general, working out progressive civilization, are ever constant, yet we are dependent on the individual for his labor, skill and ideas to make up the life as a whole. It being true that man is a dependent individual, it naturally gives rise to the eternal law—that of service.

In a sense, every individual is a servant. He renders a service of some kind that assists and benefits mankind. The mode or manner of serving in any and all service varies from the simplest to the most complex. The question always arises, what kind of service is most valuable and essential? That which is most needed and is most helpful should be most in demand, for which the greatest remuneration should be had.

We recognize three objects as the basis for all service. First, service that will assist our fellow-man in promoting his interests in physical, intellectual and commercial life. Second, service that tends to promote our individual interests and advance us in life's progress. Third, service that will be helpful in the building up and advancement of general progress. The opportunity for service is great. The demand for it is ever increasing. All service, good, bad or indifferent, must be and is compensated for in some way whether the compensation be material or immaterial.

It is the universal opinion of men of all ages that justice and right prevail, and from this comes a great fundamental principle or law, that of proportion. That as we give so shall we receive. In proportion to the service we render to our fellow so ought to be the remuneration. Ideals of service are as varied as the sands of the sea, but the ever-constant motto should be efficiency. There is no such thing as equality of service, for men, by nature, are unequal. They are not equal in their station and employments, for they are not equal in their talents. We may not all have the same ideals of service, but we may have general and progressive ideals that will tend to elevate the standard of service.

Efficient service in any field of duty should be the first requisite. It is especially true in the dental profession. I shall not attempt to consider in detail what constitutes efficient service, but, to my mind, the service that gives to an individual the greatest degree of health, vigor and happiness is the most valuable. The highest duty of man is, service to his fellow; the greatest service is, that that assists in promoting and maintaining good health, for health is the soul that animates all the enjoyments of life which fade and are tasteless without it. Some one has said, there are two things in life a sage must preserve at every sacrifice, the coats of his stomach and the enamel of his teeth. Some evils admit of consolation, but there are no comforters for dyspepsia and toothache. May we ask who does more towards the preservation of each than does the dentist? There is no business or profession in which there is a greater need for good, conscientious service than in ours. The highest standard of efficiency should be maintained. The highest ideals of conservative and progressive dentistry should be the essential training in our dental educational institutes.

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*Read before the Indiana State Dental Society, 1912.

A young man enters upon his professional career with an honesty of purpose. His supreme idea is to serve his fellow-man and earn sufficient fees to remunerate him for time and service. College days are over and he finds himself face to face with the stern realities of life. He soon learns the lesson of sacrifice. He does not remain long in the profession until he finds his ideals of service are possibly high enough, but his financial ideals have been seriously overestimated. It is quite true that much service in dentistry is more than compensated for, perhaps is detrimental to the welfare of the patient, but this is not the kind of service to which I refer. I do not wish to appear pessimistic in regard to the dental profession. There is a great deal of pleasure in our work, even though the income is meager. The fact that we are rendering to the public valuable service, that we are a conspicuous factor in the advancement of health and hygiene, partially compensates for our service.

Finance isn't all in life, but it is of vital importance in order to get on well. Some one has said that life is fruitful in the ratio in which it is laid out in noble action or patient perseverance. Some comfort may be derived from this—for our work is noble and patience is an absolute necessity in order to persevere.

Every one should want to assume his share of the responsibilities to his fellow. He should also want to be assured a proportional remuneration. I am assuming that dentists do not have an income commensurate with the service they render, and will give estimates and statistics later to prove the assertion. The dental profession should demand no more than is due it, but should not compromise with itself for less.

It is not necessary in this body of dentists to point out or tabulate the far-reaching results of efficient dentistry. It is safe to say that the compensation for progressive and conscientious dental service is not in keeping with the advancement made in the profession nor in proportion to other service both professional and otherwise and the high cost of living. Dentists, as a whole, are the hardest worked and the poorest paid of professional men.

There may be several reasons given for the present low standard of fees, if it can be said that the standard is low—and I think we all agree that such is the case.

In classifying the causes we may consider them directly and indirectly. Indirectly, it seems to be a growing tendency in organizations of various kinds and in institutions of learning to place too much stress on quantity and consider too lightly the quality of their constituents.

The essential or basic principle in any organization or institution is quality. In this busy life of hustle and rush, together with an increasing competition, we are either too apt to overestimate the quality or consider quantity the dominating factor. Can it be that our dental institutions, in keeping pace with like institutions, are allowing the idea of quantity to enter too much in the makeup of the institution rather than emphasize to a greater degree the quality? Filled with men of low professional ideals, men of lax moral character and whose educational qualifications are very much limited—if it be possible that such persons be allowed to graduate—what may society and the profession expect but a demoralizing result? Their tendency from the outstart is to drag the profession down—to place it on too much of a commercial basis. The cheap, indiscriminate advertising dentist, with his misleading and dishonest advertising, is doing much to cheapen dentistry in ideals and in financial remuneration. They must have graduated from some reputable college and permitted to practice by a legalized board of dental examiners.

The place to begin is at the beginning. The dentist must first be educated to the higher standard of professional service.

Directly, the primary reason for the low fee basis is with the profession itself. Narrow-mindedness, jealousy and lack of unity of purpose on the part of the dentists as a whole is very much in evidence. Broad, liberal ideas, harmony and good fellowship, unity of purpose and united effort will be the means of establishing a higher financial level in the profession of dentistry.

Individual dentists fail to properly estimate the value of their service, to take into consideration their time, skill, energy, and last but by no means small, their maintenance expense. Another reason is the non-appreciation of the public of the real value or worth of a dentist's service either from an esthetic viewpoint or that of good health.

These are conditions that retard progress in establishing a higher fee basis in dentistry. Who but the dentist must be the aggressor? It is up to him to deliver the goods and demand a commensurate fee. Is he doing it, or will he do it?

The growing need for dental service, the better educational facilities and modern equipment advances dentistry to the position where it is recognized as one of the leading branches of the healing art. It is not necessary to note the various steps and the detail of advancement in dentistry, but a brief mention of dentistry in the past and present will show that there has been great achievement both in operative and prosthetic dentistry, yet the fees have not advanced as has the science and art in the profession.

The practice of dentistry, as have all other professions, came about as a natural sequence. Since the dawn of the race, frailty and disease have lurked in the human family. Man's effort to free himself from the ills of life naturally gave origin to the varied branches of the healing art. Some form of operative procedure being necessary to furnish relief from diseased conditions of the teeth or distress caused by accident furnished a nucleus for dental operative procedure. Such operations were principally for immediate relief, and future benefits or uses were not seriously considered, the operations being of the most practical kind and consisted principally of extracting.

Crude methods in the practice of dentistry are in evidence ages before any special consideration as a distinct branch of medicine.

The advancement in early dentistry was extremely slow. In recent years the profession has advanced at rapid strides. Both the theoretical and mechanical side of dentistry have been greatly developed.

Even fifty years ago the educational qualifications were practically nothing as compared with the present. A few months in the office with a practicing dentist constituted the qualifications for one to enter the profession. Ofttimes his service as an assistant would compensate for his instruction. After his course of training an investment of one hundred and fifty or two hundred dollars equipped the office. No examination, no county or state license was required. The public had very little protection or safeguarding.

The first dental training consisted of one term of three or four months. For years the college course consisted of four months' term, from November to February. Thirty years ago, in nearly all schools, a man having five years of practice was required to attend but one term at college before coming up for final examination. Those not having had the office training were required to take two terms, or ten months, in college. In the year 1891 the three-year session course was started and became a graded one, the length of term being five or six months, different work being offered in each year. Previous to that, the second year's work was a repetition of the first year's lectures.

At the present time the educational qualification for entering upon a dental career is a high school course or its equivalent. A three-year course of lectures of eight months each, consisting of twelve or fifteen branches of science, together with a great deal of time spent in technical and practical training. Then a college diploma, a state and county license is required before being permitted to practice. Perhaps a sum of from $1,500 to $2,500 is spent for a dental education, say an average of $2,000. Added to this, from $800 to $1,500 is spent for equipment, say an average of $1,200. It probably costs from 75 to 90 per cent more to obtain a dental education now than when a four months' course was the requirement. What can be said about the increase in fees? The increase must be small, and no doubt but for some work, reduced. I question whether there were many five-dollar dentures, three-dollar crowns and fifty-cent fillings placed thirty or fifty years ago. This may be the extreme, but we know that there are a lot of so-called professional men doing just this kind of service.

The progress made in dentistry has greatly increased a dentist's opportunity to render a greater and more effective service. May we ask how much it has increased his income. Present achievements and advantages are conducive to service that is more beneficial to humanity and likewise is worth more to the lay public, for which the dentist is entitled to a more generous fee.

A dentist's life is not one of leisure as some may want to assume, but on the other hand one of continuous activity. His labor is arduous. His physical and mental faculties are taxed to the fullest capacity. One of the essential qualifications in a dentist's life is a test of endurance. Not in the achievement, but in endurance, is found the chief element of success.

The peculiarity of a dentist's work lies in its individuality—his business being built up and continued by personal effort. His clientele want his and not the service he could probably secure. His time and skill being his capital, it behooves him to make the most of it. The nervous strain and tension soon tend to make inroads on his vitality. The strenuous work and constant exposure to diseases often make the active period of a dentist's life short. Perhaps after twenty to thirty years' service one will have served his usefulness in the profession. The serious question arises, has his net income through life been sufficiently accumulative to serve him during the closing years. The present net income of an average dentist, in these days of high cost of living, is not sufficient to serve his purpose at the time of forced retirement from active service.

In order to get at facts in the matter, I have written to representative dentists in fourteen states and to dentists in seventy-five or more cities and towns in Indiana, to ascertain approximately what dentists are receiving for their service. Dentists have responded quite generously in giving the desired information, and many gave encouraging remarks regarding the matter, for which at this time I want to thank them most heartily.

It occurs to me that the proper method of getting at dental service is by the hour. We may not adhere strictly to a per hour basis, but it is the idea of all to make about so much per hour for their time, so the estimate is made on that basis. Cards were sent to dentists asking this information: Your hours of service daily? Approximate fee per hour? Have you increased your fees recently? Additional on the cards sent out in the State was this: Your approximate income per month? It is from this that the per hour basis is estimated. Fees should be based on the office hours we establish and not on the actual time we are busy at operating, for rents and expenses continue whether we are busy or not. The estimate made, which is but approximate, is based on twenty-six days to the month and according to the office hours established, no time being considered for holidays, sickness, recreation, etc.

In order to get at a fairer estimate, I have classified the service according to population into three sections or divisions. Cities above 75,000, cities between 30,000 and 75,000, and cities or towns below 30,000. I have attempted to make an approximate estimate of office running expense of each division. In cities above 75,000 office rent, assistant, telephone, repair, incidentals, etc., will probably average $65.00 per month, or 30 cents per hour. In cities between 30,000 and 75,000, $45.00 per month, or 20 cents per hour. In cities and towns below 30,000, $35.00 per month, or 15 cents per hour. This is not a high estimate—possibly low—but will serve our purpose. Dental materials will probably average 15 per cent of fees charged, the smaller towns and cities having a greater material expense.

Cities west of the Mississippi River, according to report, are receiving the following:

> *Cities above 75,000*—Average hours of service per day, 7; average fee per hour, $3.56; per cent that have increased their fees recently, 75; less per hour expense, 84 cents, is $2.72.
>
> *Cities between 30,000 and 75,000*—Average hours of service, 7; average fee per hour, $4.40; per cent that have increased their fees, 60; less per hour expense, 86 cents, $3.54.
>
> *Cities and towns below 30,000*—Average hours of service, 7; average fee per hour, $2.63; per cent that have increased fees, 60; less per hour expense, 55 cents, $2.08.
>
> *General average West*—Hours of service, 7; fee per hour, $3.50; per cent increased fees, 75; less per hour expense, $2.78.

Cities east of Mississippi River:

> *Cities above 75,000*—Hours of service, 7; fees, $5.50; per cent increased fees, 50; less per hour expense, $1.12, $4.38.
>
> *Cities between 30,000 and 75,000*—Hours of service, 8; fees per hour, $2.16; per cent increased, 25; less per hour expense, 52 cents, $1.64.
>
> *Cities and towns below 30,000*—Hours of service, 8; fee per hour, $2.56; per cent increased, 50; less per hour expense, 53 cents, $2.03.
>
> *General average East*—Hours of service, 8; fee per hour, $2.35; per cent increased, 42.
>
> *General average East and West*—Hours of service, 7½; fee per hour, $2.55; per cent increased, 60.

Indiana, on the same basis as other states, shows the following:

> Hours of service, 7; fee per hour, $3.47; per cent of increase, 65; less per hour expense, 82 cents, $2.65.

Considering Indiana alone and on a much greater percentage of dentists reporting, we have the following:

> *Cities above 50,000*—Hours of service, 8; fee per hour, $2.78; per cent of increase, 80; less per hour expense, 72 cents, $2.06.
>
> *Cities between 25,000 and 50,000*—Hours of service, 7; fee per hour, $1.73; per cent of increase, 70; less per hour expense, 46 cents, $1.27.

*Cities between 10,000 and 20,000*—Hours of service, 8; fee per hour, $1.72; per cent increase, 75; less per hour expense, 42 cents, $1.30.

*Cities and towns below 10,000*—Hours of service, 8; fee per hour, $1.18; per cent increase, 72; less per hour expense, 28 cents, 90 cents.

*State general average*—Hours of service, 7¾; fee per hour, $1.38; per cent increase, 74.

*Grand total*—Hours of service, 8; fee per hour, $1.96; per cent increase, 67.

There may be, seemingly, a discrepancy regarding the two different averages for Indiana. The first average consists of reports of dentists from ten cities of the State and the per hour estimate, just as they gave it, without any reference to the monthly income. The second general average is taken from a much greater percentage of reports from dentists and is estimated from the monthly income they gave.

For example, a dentist says his income is three dollars per hour, he works eight hours a day, and gives his monthly income as three hundred dollars. At the per hour fee he says he receives, he would earn more than six hundred dollars per month. This makes the difference in the two averages.

Averages according to population may seem to be conflicting, but the averages are taken from reports as they came to me. Where the average runs higher, perhaps a smaller per cent sent in reports from that particular section, and where the per cent is lower, a larger per cent sent in reports, which would tend to bring the average lower. To illustrate, perhaps in some of the divisions as classified, two or three times as many dentists would answer and send in reports as there would be in others. The number of dentists responding in each division changes the average accordingly. Should the same percentage of dentists have responded in each section or division as classified, the estimate no doubt would show the higher fees to be in the cities of the greater population and decrease as does the population.

For illustration, a dentist's cash receipts for one month is $400.00. He works eight hours a day or 208 hours a month. Rents and office expense, $30.00, or 14 cents per hour; materials for use, 15 per cent; for his time he has $1.49 per hour. No consideration made at all for living expenses. Thus we may see, from reports direct from the dentists, that the fees are extremely low. Too much so, for the nature of the work we are doing, and considering the benefit to humanity. I shall not attempt to make a comparison with other professions or businesses, but our fees will certainly show a low scale.

This is an age of intellectual advancement. The individual and the race are constantly striving for the best in life. As we drift into new conditions, new environments and higher conceptions of living, so are the ideals of conservation and preservation of health, beauty and happiness ever manifest. Through the press and by actual contact one with another, in this enlightened age, the masses of the people are becoming educated to the fact that the profession of dentistry is doing a great and lasting good in relieving distress and in correcting oral abnormalities. Dental school inspection is doing a great deal toward bringing people face to face with actual conditions relative to the care of the teeth. It is proving a valuable asset to the volume of dental work.

In view of the fact that the reports show and that we personally know the fee average to be low and that people everywhere are appreciating, more and more, better service and that the profession is continuously advancing and offering increased quality of service, is it not an opportune time for dentists to begin to seek a more reasonable recompense for service rendered? If we are not sufficiently paid for our service, who is to blame? The dentist. If the fees are to be increased, who must be the agressor? The dentist. Who must discuss and promote oral hygiene? The dentist. When ought it be done? Now and continuously, because this is the opportune time. Why are people in a more receptive mood? Because they are reading, hearing and seeing the need and the results of dental service more today than ever before. How can a higher standard of fees be made effective? By the activity of the individual dentist in his particular sphere.

In conclusion, may it be realized that dentists are alive to their needs, may efficient service and a just recompense be the constant ideal, beginning with the matriculation of the student and continuing throughout the various societies and organizations of advanced dentistry.

If we adhere closely to the long-established principle—that in union there is strength—there is hope for better things in dentistry. Unity of purpose and united effort will bring to pass results most needed in the dental profession.

### DISCUSSION

H. C. SEXTON, Shelbyville: Dr. Chattin deserves a great deal of credit for this paper, credit for the laborious task of collecting the statistics he has here given us. These statistics Dr. Chattin is not responsible for. He has simply reported to us what was given to him, so, in my talk, when I question the correctness of the statistics, I am not reflecting upon Dr. Chattin but rather upon all of us dentists, for we are the ones from whom he got his information.

In my opinion, the figures given in the paper are too high all the way through. In the first place, I come to the cost of office equipment. The essayist gives the average as $1,200. I believe we could cut that 50 per cent and say that the average equipment costs about $600.

One statement of Dr. Chattin's has given me quite a shock. He says that after twenty or thirty years a man will have served his usefulness in the profession. Now I have been practicing for twenty-three years and I am not ready to be laid on the shelf by a great deal. In fact, I feel that I can go on about twenty-three years more, for I am a better man mentally, morally and physically than I was when I started. I'll not enter into particulars because some of my friends here might try to pin me down on that moral proposition.

I believe the practice of dentistry is not as hard as we sometimes make it out to be. It is not hard unless we take it hard. No one ought to try to make a million or any other big sum at it. He should get that out of his system at once. It is not possible, never has been, and never will be. He should apply to himself the eleventh command-ment, which Elbert Hubbard says is, "Do not take yourself too damn serious." Some dentists do take themselves too seriously and consequently overdo things. The man who operates eight hours a day and then does laboratory work at night is taking himself too seriously. He is the kind of a man who in twenty-three years, or in half that time, will be played out and laid on the shelf, and in all likelihood he will blame his profession for it. The profession is not to blame; it is the man himself. Practice should be taken temperately, like eating and drinking. Work does not kill a man, but overwork and worry do. Instead of taking a vacation once a year a man should take a vacation or a piece of one every day. A dentist is under great strain in his work, and when he operates eight hours a day he is doing too much, far too much. If a surgeon operates one or two hours a day he is doing a good deal. Yet the strain upon the dentist in some operations is as great as that upon the surgeon.

I'll tell you the most profitable thing for any man to do is to loaf with his soul, and it is one of the most enjoyable things as well. The dentist who loafs some with his soul every day, loafs with it over a book or any other way, is not going to wear out very soon. My opinion of the practice of dentistry is somewhat like the opinion of Hans, the Dutchman, about beer. Hans said: "You cannot trink enough peer to hurt you. Twenty-five or thirty glasses of peer a day is good for any man. Oh! of course, you might trink enough to hurt if you'd make a tam hog out of yourself."

I think, too, that we blame the profession too much when we say we cannot save in it a competency for old age. We ought rather to lay the blame upon ourselves. No man lays up a competence in any profession or business until he learns to control himself, learns to conquer his own appetites and inclinations, and whether he is making ten dollars a week or two hundred this same principle will apply. I think the average dentist, instead of controlling his expenditures and applying business principles to his practice and to his life, lets things go with a loose hand and then says that in the practice of dentistry you cannot save up enough to make you comfortable in old age. The truth of the matter is that he is the one at fault, not his profession.

Now it is not what you make in this world that counts, but what you save, and what you save is determined by the amount of mastery you have over yourself. The business education of the dentist is very much neglected. There should be a chair in every dental college teaching the student the business, the dollars and cents of life. He should be taught not only to charge good fees—that is only one half of it—but he should be taught how to regulate his expenses and how to regulate himself in the dollars and cents line. He should be taught the science of investment. Dentists as a class are too prone to buy gold bricks.

To come now to the statistics of Dr. Chattin's paper: I have reduced them to a yearly basis and in that way they are made more intelligible to me, and I believe they will be to you.

In the states west of the Mississippi River, in cities above 75,000 population, the average fee per hour is $3.56, which amounts to $7,800 per year. In cities between 50,000 and 75,000 the average practice figures out $9,600. Now you see there is a discrepancy there evidently. It seems to me the larger places should average larger than the small places. The general average of all the practices west of the Mississippi River figures out $3,600 per year.

For the cities east of the Mississippi River above 75,000 population, the average practice figures $12,000 per year. The cities between 50,000 and 75,000 figure $5,300 per year. The cities below 50,000 figure $6,300 per year. That seems odd again. Here the smaller towns have the advantage over the larger ones by a thousand dollars a year.

Here in Indiana we notice the same peculiarity. In towns between 10,000 and 20,000 the average practice is $4,200. In cities from 20,000 to 50,000 the average practice is only $3,800. I wonder, are the dentists in small places bigger liars than those in large places. I am from a small place myself and modesty compels me not to decide this question.

From the returns made, we figure that the average practice all over Indiana is $3,336. Now, in my opinion, we could cut that more than 50 per cent and be nearer the truth. I estimate the average practice in Indiana to be about $1,500. The big returns made by my professional brothers only proves after all that they are men. You know that the Psalmist David says in his 66th Psalm, 11th verse: ''All men are liars.''

There is only one thing that makes me feel better about this whole affair, and that is that we country dentists did not allow you city fellows to blow it over us, as we usually do. The worm has turned at last.

I will just speak of one other matter before I close. It is Dr. Chattin's opinion, I believe, that the average income from dental practice is lower than that from any other profession. I think just the reverse. The average dentist is better off, in my opinion, than the average lawyer, physician, or preacher. We are unjust to our profession when we talk otherwise. It doesn't pay to knock, anyway. We all get along better when we boost. ''When a feller has a dog, even if it is only a yaller dog, he should not only keep others from kicking it but he should refrain from kicking it himself.'' And the more you love a dog the better he'll love you.

Dr. A. F. Steinheiser: The subject of the paper which has just been read is one that has been under consideration for the past year, more or less generally, throughout the country. A good deal has been written, some good advice has been offered, while some has been more or less indifferent. Dr. Chattin has gone into this subject very carefully and he has taken great pains to prepare his paper in giving the figures that are no doubt as accurate as can be obtained in this way, and it goes to show that the dentist's net income seems to be low as compared with men engaged in other lines, especially as compared with the services that we are supposed to render. The essayist has made it plain that the kind of work we are considering is efficiency. The poor class of work is not taken into consideration at all, because no doubt it is quite true that the man who does poor work, and does it cheaply, is possibly more than paid for his effort, but the operator who takes time in preparing cases that require patience, skill and knowledge is entitled to some remuneration for the time spent. It seems that the fees for dental services have been based largely upon the operation itself. Personally, I feel that this is wrong. We, as dentists, should base our fees according to the time consumed at the operation, for more reasons than one. In the first place, it is an injustice to charge one patient the same fees that you are charging the next patient for the same operation which required twice the length of time that it has taken to do the work for the first patient. We all know that patients differ and are more or less sensitive. Some we can go along with pretty rapidly, while others take up more time in some way or another; then, some are given to conversation more or less, which by all means should be discouraged, for when they find that they are paying for time they will not only be prompt in fulfilling appointments but will be willing to take all that they can get during the time that they are in the chair.

The figures that Dr. Chattin has been able to get seem to average pretty low. If we went more thoroughly into the matter I am afraid we would find them still lower, taking into consideration the dentist's overhead expense, the interest on the investment, and if we wish to take into consideration the time that he spent in college and the value of that time during his college days, the expense for office equipment, and about five years of time which is required for the average man to establish himself—for usually he spends considerable time in this respect. Now, these figures giving the number of hours devoted and the time expended in the office as eight hours or seven hours, as they vary in many cases, and as the man is not busy during all those hours, and consequently if he has given his fee as three dollars or five dollars per hour, he is not getting that. It should be taken and averaged for the eight hours. For instance, if he has been occupied for four hours and his fees have been but five dollars per hour, instead of having $40.00 to his credit he has but $20.00, which reduces his average. Then, as to getting at what is a fair fee—that depends, of course, considerably upon the operator, his ability, the experience he has had and the general class of patients that he is working for, etc. Of course, it is not fair for a newly graduated man to expect as large a fee as the experienced operator, who has given a good deal of thought to the work and is able to render much better service during a given amount of time than the newly graduated. As the essayist has said, we must be fair to our clients, and the man should govern his fees according to the time and experience and his ability. The longer that he has been in practice the more should he be entitled to higher fees. In the difference of the figures given by the essayist and the figures given by the dentists themselves as the fee that they have received per hour as the average income per month—if you will take your pencils you will find that there is a difference of one-third, showing that the dentists themselves have been deceived. It all goes to prove that inasmuch as you know we are working too cheaply, the trouble seems to be that we are poor business men to begin with. No business man would conduct his business as the average dentist does his practice. The average dentist does not seem to have any knowledge of his monthly expenses. He figures in, roughly, his rent, and his office help, and his supply bill, the telephone and the light, and that is about all. If he has a streak of luck and makes a fifty-dollar bridge today he thinks he has done pretty well, collects half of it and at the end of the month he finds that he is way short. He does not seem to gauge his hours properly. The work should be divided. Certain hours should be devoted to certain classes of work. These things should be figured out by the operator to suit his convenience and in such a way as will enable him to make the most out of it during the time spent, both in justice to himself and to his patients. It seems to me that one great trouble and reason that we are in this position and are working so cheaply is that we do not understand one another as we should. We do not know enough of one another. While it is true that we do more or less missionary work among our patients in the way of education, it is also true that, as the essayist has stated, to begin is at the beginning. Why not begin right here to educate one another. Of course you will state "that is all very well and good for you fellows who are located in a large city, but it is not possible for those located in the smaller communities." There is scarcely a community but where there are three or four dentists, and it seems to me that these men might be more congenial—if they don't belong to the State society, let us get them in and then go after the other fellow and get him in. Meet with one another. Be sociable. Somebody has to take the initiative, and if there is just one member in a community who belongs to the State society, or who feels the need of the advancement in the fees then he should go to the office of the other fellow and have a heart-to-heart talk with him, take him to lunch, and get close to him, and he will tell you something which will be of interest and of value to you. Likewise you may do the same and become organized. Have a little local society. There should be more local societies and county societies; also, attend the local society at Indianapolis and by social intercourse with one another we will be able to have a better set of hours and improve our conditions along this line. I appreciate personally the efforts of the essayist along this line, and while I agree practically with everything in general, I do not feel that there is anything further for me to say, and I trust that this paper will excite a hearty discussion for the benefit of all of us. I also wish to thank Dr. Chattin at this time.

Dr. E. R. Kibler, Indianapolis: I believe, if I understood Dr. Chattin correctly, he said the average fee per hour was $1.38 cents in the State. Well, of course, we all agree that that is too low. I think we ought to make more than plumbers, bricklayers and blacksmiths. You take your automobile down here to the garage and have work done on it and they will charge you a dollar an hour, plus the cost of the material. Those men have not paid a cent for college education, the chances are. They work in overalls and do not have to maintain an office. If a man is making only $1.49 cents an hour and his office and living expenses have to come out of that, I don't know how he is going to save very much money. It surely is a bad proposition when we stop to think about it. Now the thing that confronts us is how to get larger fees. I guess we all want larger fees. I do not suppose there is a man here that thinks he is getting enough. How are we to get larger fees? I think this question was answered this morning to a certain extent in the paper of Dr. Barber. If you want to get good fees you know we must do good work and be able to sell it, and one of the first essentials to a good fee I think is salesmanship. I will put the thing on a commercial basis. I believe we all, in a sense, are salesmen. I believe that we can influence our patients to have what we think they should have and pay us the fee that we think is reasonable, and that we actually earn. The man who will not talk to his patients from a salesman's standpoint I believe is not grasping his opportunities. The average patients come in and are willing to leave it to us. They say, ''fill this tooth, or repair these teeth, in the way that you think they should be''; then, instead of putting in a vulcanite plate put in a gold one, and get a good fee for it, and you will do them a better service and you get a better fee. Instead of putting in amalgam fillings put in gold inlays, and you will do them better service and you can get a better fee, and they will thank you for it.

Another thing which was brought out this morning is painless dentistry. If you want a bigger fee, equip yourself to do painless dentistry. They will pay you any fee that you want. You heard Dr. Barber of Chicago tell you this morning that he gets $25.00 an hour. We cannot get $25.00 an hour here, because we are not living in the proper community. We have not enough people who can afford to pay it. We would like to, but the man living in the smaller communities does not have to make the amount that the man in the large city does. His expenses are not as great, but there is not one of us here but can better our conditions and get larger fees, I do not care who you are or where you came from. It is up to the man himself—it is a matter of personal equation.

One little point that I wish to make on the fee proposition and which causes a man a great deal of trouble, I believe, is the itemization of an account, which I believe to be wrong. In the first place, it is not necessary to itemize your account. A patient that comes to you should have entire confidence in you, and I do not believe there is one of us here that would take advantage of a patient and charge him for time and labor that he did not get. Personally, I never itemize an account. I never did, and in the six years that I have been practicing I think I have had three people ask me for an itemized account. I am always willing and glad to give it, but I think that we simply keep ourselves continually in hot water by itemizing our accounts, especially in the smaller communities, where I can see that it would conflict more than it would with the men in the larger towns, for the very reason that our patients go to each other and say, ''Dr. So-and-So charged me $10.00 for a crown,'' and the next patient will say, ''He charged *me* $25.00.'' They cannot understand it, and they do not see why you should do it. If you do not itemize your account they do not know so much about your fee or how you are charging them. You do a mouthful of work and send them a bill for services, and that is all that they know and all they should know. It is not right that we should charge all people the same. We cannot make the same fee. I think we should charge according to the paying capacity of our patient and time consumed—that is the way I feel about it. There are some men who will take exception to that statement. If we have a tooth that is in bad condition and needs a crown, and we are going to take five hours to do it, and the man has an income of $10,000 a year, is it not proper that he should pay more than the man who makes only $2,000 a year and for whom it took you only about two hours to do the work? There is just one point I wanted to make, and that is this: Just remember that there is not one of us here who cannot get a larger fee. If we will remember that and go back home and equip ourselves with all the modern improvements to do modern dentistry, we will all be financially better off by the end of the year.

Dr. W. E. Kennedy, Indianapolis: I wish to congratulate the author of this paper for the efforts he has put forth in obtaining some of the reports that he has read to us. I want also to congratulate him upon the selection of the subject and the presentation of it to you in a different way from the usual way of talking about fees. I am not in any manner disappointed in the paper presented. I do not like to use the word ''I,'' but I asked Dr. Chattin to write a paper and read it before the Indiana State Dental Association, and he wrote back and said he could not do it. I wrote back to him and said, ''You will have to do it.'' I have asked older men to write papers, and have asked them to give clinics, and have asked them to do this, that and the other, and they say, ''Oh, put some one else on the program. I have been on it before.'' Thus the executive committeeman suffered, and so I appointed Dr. Chattin, and he has written a paper that ought to appeal to the National body of dentists. Now, the paper was read and a number got up and left the room. They left the room because they are satisfied with their income, and the discussion of the paper and further talk upon the paper did not interest them. Whenever a man is satisfied, gentlemen, he will not go very much higher, if you please. The man who is not satisfied is the man who is stepping higher and higher upon the round of civilization, or upon the round of finance, or the ladder which is his ideal, to gain its top. I cannot conceive of any profession, if you please, where any man can reach that state of satisfaction where he will sit down or he will leave the room when something is being said that appeals or should appeal to him as strongly even as perfection. We may not live with the club or the stone; we are past the club age, or the wooden age; we are past the stone age, we are past the iron age. We are living in the age of the most rapid progression that anyone could ever conceive, or anyone could ever imagine, even only ten years ago. If that is true, you cannot club the fruit from the tree and live as our forefathers did, from hand to mouth. Therefore, the man who is satisfied today will not be permitted to live the same sort of comfortable life with the man who is not satisfied. Now what kind of a life do we want to live as a professional man, be it this or any other profession? Do we want to live the life of comfort, or do we want to live the life of a slave? If we are living now in a community of comfortable-living, civilized beings, why not ask the same sort of life from them that they themselves are enjoying. This is the intention, or was the intention, of the Creator, that we rise above the pale of the common brute. I am not censuring anybody, I am not condemning anybody, but we are what we are, because we are that, and if we are placed in a period of such progression and such financial movement or social advancement, and of a greater scope of civilized living, then we as a profession must rise above being merely satisfied. Why am I talking this way? Because it appeals to me, ladies and gentlemen, and I do believe and know that if we will just use common sense we will not be satisfied. The intent of this paper was to make us think and try to realize whether we are receiving recompense for the services rendered. If we are not receiving that recompense for services rendered, then it resolves itself to us individually—not to the essayist, not to the State Association or any other body of people—to us, individually, to increase our fees. How will we increase our fees? Not at a bound, but gradually, month by month and year by year. My fee is a little larger this year than last year, and last year it was larger than the previous year. I am not getting the same fees that I was when I left the dental school. The reason of it is because my expenses have increased, with my office equipment and otherwise; also, because I am like Dr. Sexton, if you please, I feel that I am just a little more proficient than I was a few years back. Now I would like to say something about those totals and percentages. The reason that the essayist, to my mind, obtained those was to show us that we are not getting $3.00 an hour. We wrote and told him we were getting $3.00 an hour, or $4.00 or $5.00, as the case may be; he took these figures and made an average fee in Indiana of $1.38 per hour. Most dentists work on Sundays; most of us work more than eight hours a day, for many go back to the office and work after the dinner hour. One of the gentlemen who preceded me said that dentistry was not a strenuous life, it was what we made it. Now that is true—if we do what we should do. But we cannot do what we should do if we are getting only a very minimum fee. We cannot live in civilization properly if we are getting a low fee. We must make ourselves slaves for eight, ten or twelve hours a day at hard labor that we may pay our expenses and live as we should, and there are a great many who work a great deal more than eight hours a day, and some work more than ten hours a day. Now, then, if dentistry is what we make it, let's go out and make it better, make it humane to ourselves as well as to others. If we can make it a profitable profession, let's make it that way, but we cannot make it that way and live on a very low fee. There are a great many things in the world besides money, as was said by our dear friend Abe Martin, but how are you going to get them? You must obtain a fee if you rise above the average in life.

One of the gentlemen who discussed the paper spoke about the mechanic who was getting so much per hour. We know that he did not mean this in disrespect to the mechanic. The mechanic is just as much a gentleman as any man. He did not say that in disrespect to him. We like him, and we need him, and he is getting a good fee at $1.00 an hour, with all things else paid, and you pay for material, etc. We are not getting a good fee if we are making $1.38 per hour on the average. Another thing I want to say as to the averages obtained by Dr. Chattin, and I consider, as Dr. Brown has said, that they are possibly, and I do not doubt it at all, that they are just about twice what they really should be. If you obtain or get $3.00 an hour it means $7,512 a year, and it is known that the average pay of the dentist, or the average income of the dentist per year, not the net income, but the gross income, is in the neighborhood of $1,500, and I will venture to say that there are not two men who sent in their cards and said they were getting less than $3.00 an hour. If I am wrong, doctor, I want to be corrected. I thank you.

Dr. H. C. Brown, Columbus, Ohio: I want to assure you that it gives me great pleasure to meet with you on this occasion, but I regret that your secretary should have noticed that I was back there. I was enjoying this discussion, although I did not hear the paper. I appreciate, however, that it has been a subject that should interest us all. There have been some very good points brought out in the discussion, and I agree with Dr. Sexton in his willingness to assume that some of these reports, which have reached the essayist, are probably a little overdrawn. I can hardly appreciate that the dental profession as a whole is in quite so favorable position or that their income is as great as was indicated. I cannot think that this can be so. I wondered when those statements were being repeated by Dr. Sexton whether or not there was going to be a footnote referring to some place giving confidential information and quoting a ''50 per cent discount.'' We see this sometimes in catalogues which are sent out ''with the usual 50 per cent discount.'' I regret that the dental profession is not a better appreciated and a better remunerated profession. It has been very correctly stated here that we are largely responsible for our own condition, and I feel that the first and most important thing for us to do is to thoroughly equip ourselves to render the service which we may be called upon to perform. I feel that this is of the utmost importance. Then we should render the service in the best possible manner and impress it upon our patients, if necessary, that we are doing them a professional service and that it is more important than the service of the plumber, as has been mentioned. The question of the benefits derived from a healthy and hygienic mouth is so much better recognized today than it was formerly, and the way for us is much easier than it was a few years ago. The system of public education is a most important one and our profession is fortunate in having an editor in charge of a magazine in this city that is doing some magnificent work. That magazine goes to the dental profession of the entire country, and it was my pleasure to recently read a paper of his before it appeared in his own journal, and I wrote him expressing my commendation of the same.

As we advance in our profession there is one most important way in which we can help ourselves, and that is by taking advantage of our opportunities and strive to improve the organizations of our profession. I am certainly gratified to see that there is such an interest in the Indiana State Dental Association and was much pleased last night to learn that you had passed a resolution endorsing the reorganization plan of the National and unanimously voting to become affiliated with that organization. A few years ago many of these things could not have been accomplished for the reason that we were not educated to appreciate the benefits of such organizations. All trades and professions are better organized than the dentists, and they are not only looking after their interests and advantages that they have, but they are taking care of things for the future, and it behooves us, as a profession, to look after our organizations. At the same time the advancement that we make is possibly a little more liberally distributed to our clientele than is the case with most avocations or professions. I think that the advantages to be derived from such an association as you have is received by your clientele to a marked degree, and usually fully appreciated. I believe that your patients at home appreciate the fact that you take the opportunity to attend your State meeting. I think it does you a great deal of good. You go back home enthused; you get new ideas; you start out with a renewed inspiration, and it not only assists you but you render your patients a better service.

Dr. Chattin (closing): I feel sure that the object of the paper in the beginning, which was to excite interest among the dentists and get them to thinking that they were really not getting enough for their services, has been attained. I am greatly indebted to those who discussed this paper, because they brought out a number of interesting points. Dr. Kennedy, I must say, that we had a few dentists that were honest enough to say that they were not getting $3.00 an hour, and some of them were honest enough to tell me about what they were getting. We are all honest, of course, but some of them were mistaken, I suppose.

Just one or two points to emphasize, and then I am through. In regard to something Dr. Sexton said—I want you to keep in mind the word *approximate,* which was used a number of times in the discussion, and the word *average* was used a number of times. Now, I said that the average usefulness of the dentist was between twenty and thirty years. Dr. Sexton and a few others may be above the average. I spoke about the average only. Another thing that was not thoroughly brought out was this: The per cent who have increased their fees, I believe, was something like 70 per cent. If we had received the suggestions that I have read to you on the basis that was given, $1.38, and 75 per cent of the dentists have increased their fees recently, what may they have been a year or two ago? That is one point that was not brought out.

Again I want to thank you for discussing the paper and the interest that you have all taken in the matter.

## GOLD INLAY*

BY DR. DAYTON D. CAMPBELL, KANSAS CITY, MO.

Melt a spatula full of hot inlay wax into Keeton's mat gold and take impression of the cavity the same as you would with wax. Remove the wax cold and invest in any good inlay or bridge investment completely, except a small place about four millimeters in diameter through which to flow solder, and after the investment is dry place it on the fire and heat it up, keeping the heat underneath the investment all the while. Cut the solder into strips and when the matrix is hot enough flow in the solder. This is a method of utilizing your mat gold scraps, and you do not have to pay for the wax at gold prices. Dr. Emery Ballou, of Dodge City, Kansas, taught this method in 1895.

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*Clinic Indiana State Dental Society, 1912.

# PROPHYLAXIS AND ITS RELATION TO PYORRHEA*

BY J. P. CARMICHAEL, D.D.S., MILWAUKEE, WIS.

WE WHO BELIEVE in the surgical treatment of pyorrhea generally, concede that it is due to disease of the peridental membrane. We know there is little, if any, deposit of tartar until after the gum is loosened, and that the calcareous deposits are always attached below the enamel and to the peridental membrane. When the peridental membrane is exposed to the fluids of the mouth it becomes diseased and laden with micro-organism. Following this condition there is a general breaking down and wasting away of the bone structure about the tooth. In treating this disease, then, we must go further than to simply remove calcareous deposits, and must remove all diseased tissues. This is best accomplished with the instrument made on the plan of a Japanese draw-plane, which has a bearing in front of the blade. This instrument operates as a plane and will leave the surfaces smooth. You can determine whether you are removing calcareous deposit or diseased membrane by the sense of touch, and you readily distinguish by the feel of the instrument when you have cleaned the surface down to the hard tooth substance. By careful operating you will succeed in getting out all infected tissue about the tooth. This instrumentation is usually followed by very rapid healing, there being no further discharge of pus, upon the following day.

There are some cases where the disease seems to have penetrated the alveolar process, following as it does the course of least resistance. In this event we find areas of infected tissue, sometimes remote from the roots of the teeth, and occasionally channels running from one root to the other through the alveolar process.

These cases usually show a chronic inflammation of the gum and require some additional treatment, owing to the engorged blood vessels, due no doubt to the absorption of pus. I believe that this disease is local, and if it were more generally recognized by dentists in the earlier stages it would be a simple matter to check its progress. In fact, this disease, which is due to microbic action, could be entirely prevented by the proper prophylactic treatment.

Nature has covered the crown of a tooth with enamel for a twofold purpose; it is hard, to protect the living organism beneath; smooth and lustrous, that it may ward off foreign matter, thereby protecting it from disease. Anything which mars the enamel or dulls the polish serves as a place of adhesion for sticky substances, which presently adhere about the necks of the teeth. Only when the enamel is absolutely smooth and the polish most highly preserved will the teeth be able to protect themselves as Nature intended. Dentists who undertake to clean teeth by the use of harsh substances contribute to the destruction of the natural polish on the enamel, whereby they aid the tendency of the teeth to retain sticky and foreign substances, which should otherwise readily be thrown off. And we know that the lodgment of foreign matter about the necks of the teeth is responsible for the prevalence of pyorrhea. Furthermore, pyorrhea is induced by our artificial mode of living in eating prepared foods; the combination of sweet and sour form sticky substances which adhere to the teeth and are not readily removed by mastication. If the soft deposits remain long enough, chemical action is set up, causing corrosion of the enamel and a breakdown of the connective gum tissues; nothing should be permitted to facilitate these primary causes; but due care should be exercised to keep the surfaces absolutely smooth, thereby this tendency may be avoided.

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*An address before the Southwestern Michigan Dental Society, 1912.

It is necessary that we should find means by which the enamel can be kept as highly polished as Nature intended it should be. There are many cases, when patients call upon a dentist to have their teeth cleaned, that the dentist proceeds to scour the teeth with powdered pumice stone. It is important that we draw the line between scouring teeth, cleaning teeth and polishing teeth. By scouring teeth we are destroying the high polish on the surface. We are deadening the beautiful life lustre and making a new foundation for deposits on the teeth. The instant you apply powdered pumice stone, I care not how finely prepared, you dull the enamel surface. Enamel is extremely hard, and its highly glazed surface was intended by Nature to protect the tooth from disease; pumice stone is hard enough to scratch the enamel, and from that moment the natural polish is destroyed and the luster gone. After this you will notice that the teeth stain very easily and become dull. We are deceived by the appearance of the teeth after having removed the stains by the use of pumice, for the reason that the flow of saliva gives them the appearance of being polished. Were we to dry the teeth and examine them we would find that the natural lustre had entirely disappeared. In reality, you have done more harm than good. Your patient returns in a few days with the teeth more stained than before, often complaining that the life lustre has disappeared. This is a result of scouring the teeth. It is best for us to remove the stain by applying a substance which will not scratch, but will leave the enamel smooth and capable of receiving a lustre. For this purpose I use Carmi-Cleaner.

In my clinic this afternoon I will demonstrate a friction polish to which I have given my endorsement. It is the result of much study and investigation along this line. My aim was to produce a substance that would act by friction to obtain the highest polish of the enamel and to restore its original brilliancy.

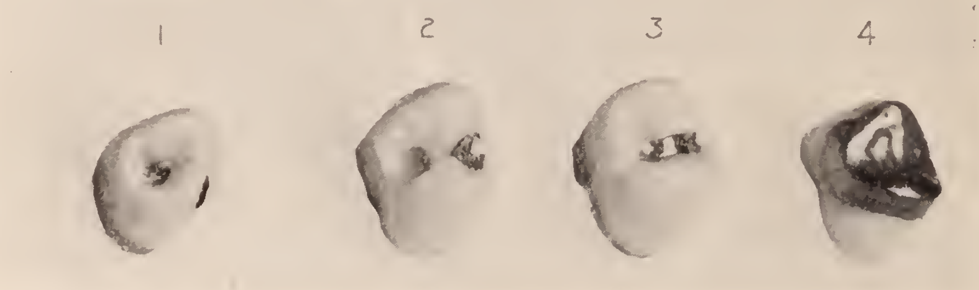
In many instances patients are using tooth powders that are entirely too harsh, thereby destroying the lustre. In my practice I direct patients to discontinue the use of all tooth powders and pastes; I advise them to tape the teeth occasionally and rub them with a cotton roll, and direct the free use of water only in the healthy mouth. Of course an antiseptic may be prescribed when indicated and vigorous brushing, as we know, is good to stimulate a healthy circulation in the gums. The highly polished surface can best be retained by no other than a vigorous rubbing with some friction polish, there being none better that I know of than Carmi-Lustro. If you polish all surfaces to the gum margin properly, I believe you have done much toward the prevention of pyorrhea.

The practice of the day is the adoption of preventive measures and the restoration of the teeth to a state of Nature is in line with the highest attainment in dentistry.

# CONSERVATIVE METHODS IN PRACTICE*

### DR. F. R. McCLANAHAN, RUSHVILLE, IND.

This clinic is primarily intended for the men just entering the profession. It seems to me that a great deal of the work of the dentist today is tending to the reckless destruction of tooth substance, rather than the conservative methods of some of our best dentists who have been saving teeth these many years. I cannot conceive of any substance placed in a tooth that is superior to good enamel backed up by solid dentine, and to cut this away and replace it by gold or other filling material is rank folly if not actual malpractice.



Many of us have a regular clientele and it is our aim, of course, to take the teeth before extensive decay has set in; such a case is represented in Fig. 1. Here are two small pits that want only to be cleansed of decay and so shaped as to retain the filling.

In the distal, the base and walls are filled with tin and gold (Duplex) and left that you may see the method, and the mesial pit represents the finished filling. In Fig. 2 the tendency is to cut through the strong central ridge that binds the cusps more firmly together and also aids materially in mastication and which is rarely replaced with a filling, but left flat. The distal cavity is left unfinished and in the finished filling is built up with gold. The soft tin and gold in contact with these marginal walls makes, in my judgment, the most successful restoration for this class of cavities possible to produce.

The mesial of this tooth is restored similarly, except more gold is used and care is used to have a flat seat or one rather inclined to the axial wall.

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*Clinic before the Indiana State Dental Society, 1912.

Why we should cut away this good enamel and dentine farther than is represented is not plain.

In Fig. 3 the central ridge is not well developed and decay had extended from one pit to the other, hence should be cut into one cavity and filled as the others.

In Fig. 4 decay has so far advanced that the mesial and distal walls must be cut away, but only to where the dentine and enamel are perfectly firm and free from decay; if they are removed in this case to underneath the free margin of the gum you have so weakened the tooth that sooner or later the force of mastication will split it. Even as it is, it requires a gold inlay, as the impact of mastication on a filling will still further condense it, with a tendency to cause it to split, and farther, it is most difficult to pack a gold filling here without it exerting a splitting action.

This is entirely overcome by the gold inlay. The lingual cusp is somewhat removed and the cavo-surface angle leveled; the labial cusp is left intact for esthetic reasons and also because it is quite well protected by the inlay. In approximal cavities, where the decay has advanced to near the gum margin, it is quite correct to cut beneath these margins and secure a firm, flat seat for either filling or inlay.

The labial cavities in these teeth are most admirably restored by the inlay, the location rendering a filling of gold very difficult.

My method of procedure in the latter case is to remove the greater part of decay, especially beneath the gum margin, and temporarily stop with gutta percha; at the next sitting this filling will have exposed the margin of the cavity and it can be prepared much more satisfactorily.

## HOW TO SWEAT BANDS*

BY C. S. CUDEN, D.D.S., PITTSBURGH, PA.

Cut the band as you would for soldering, make an edge-to-edge contact (not a lap joint), clean surfaces and close adaptations are essential. Use very little borax and apply a thin flame from blow-pipe until a white heat is obtained. A surface melting will result and will run in the joint of the band. At this point great care must be exercised not to burn your band. because a brittle band will result if too much heat is applied. With a little practice one can learn to sweat bands as you would solder them. and it is far better than soldering for the following reasons:

1. When finished no seams can be detected.
2. Stronger than solder joint.
3. If crowns are used for bridgework you will never draw solder out of the joint in filling your dummies.
4. Your scrap gold is not contaminated with solder and can be used for inlay work.
5. A considerable sum is saved on 22k solder.

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*Clinic Lake Erie Dental Society, 1912.

# A LOWER POSTERIOR BRIDGE WITH CONVERGING ABUTMENT*

BY W. S. WALTERS, D.D.S., W. LAFAYETTE, IND.

*Case:* Lower, left first and second molars have been extracted, using as abutments for the bridge the second bicuspid and the third molar. This molar, as we very often find, converges or tilts toward the bicuspid at an angle of about 45 degrees. (See Fig. 1.) Make both abutment crowns as for ordinary case, and in making the crown for the converging molar pay no attention to the articulation except on the disto-occlusal, the reason for so doing will appear later.

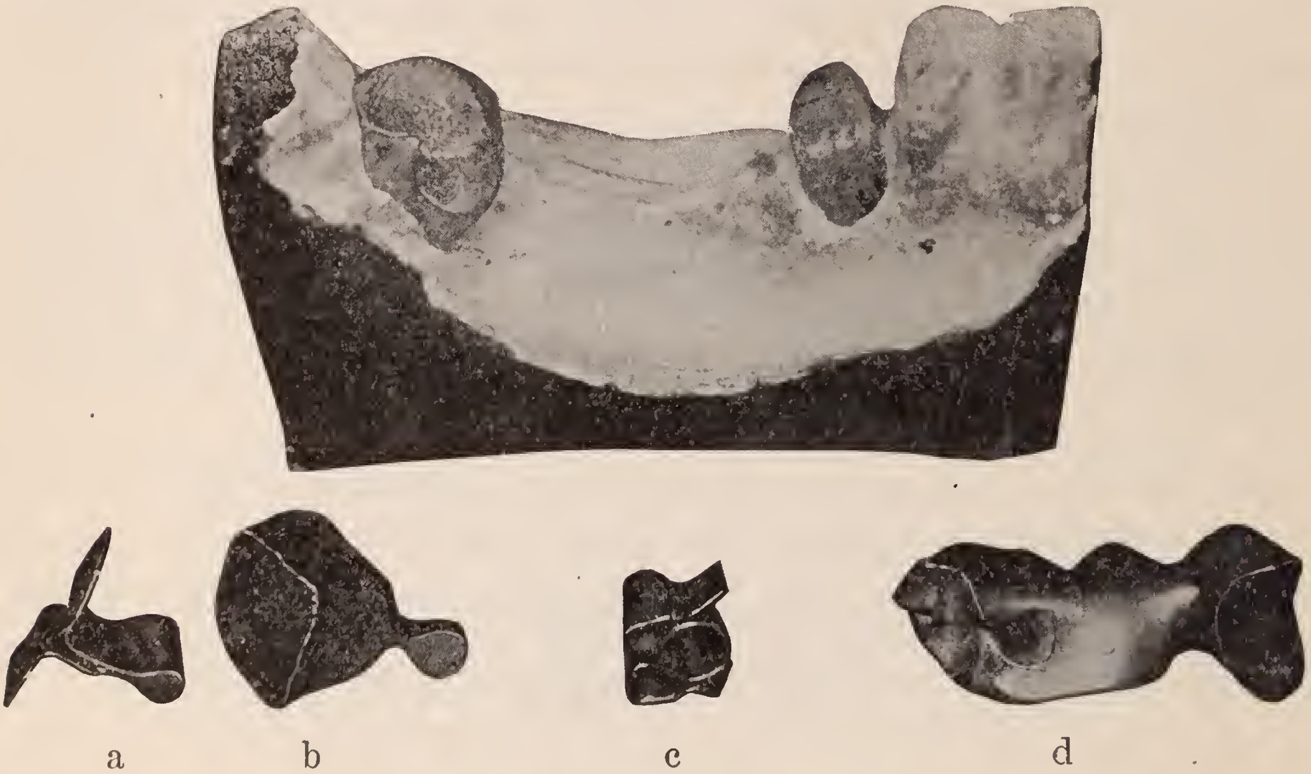

Fig. 1

The secret of the success of this bridge lies in the fact that it is made in two sections with a locking device, which is made as follows: Take two strips of 22k 30-gauge plate gold about 3/16 of an inch wide by an inch long, anneal and place one strip upon the other and grasp them in the middle with a small pair of round-nosed pliers. Now bend the ends of these strips of gold up around one of the taper noses of these pliers and grip them in a small vise or pair of square-nosed pliers so as to make two perfect cones with wings extending from their sides. Carefully separate the two cones and flow 18k solder inside the male cone and on the outside of the female cone so that subsequent manipulations will not distort their shape and ruin the perfect fit of our locking device. It is well to use an anti-flux on the parts that you do not wish the solder to come in contact with. Now bend the wings of the male cone at right angles and adjust it to the converging molar crown so that the cone portion is parallel with the bicuspid crown abutment. Now remove from the model and solder. (See Fig. 1b and Fig. 2.) Place both abutments in place and slip the female cone in place over the male cone, bending the wings so as to engage the inlay (Fig. 1c) wax, which you now place in position to carve up for the first and second molar dummies (the space being closed, in this case we carved up a third bicuspid and a second molar). Let the wax extend well over the occlusal surface of the molar crown to restore the occlusion with the opposing teeth and to take the strain off the locking device. After carving, remove the wax model, which will carry the female cone with it, and invest and cast. Now assemble in position and solder to the bicuspid abutment.

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*Clinic at Indiana State Dental Society, 1912.

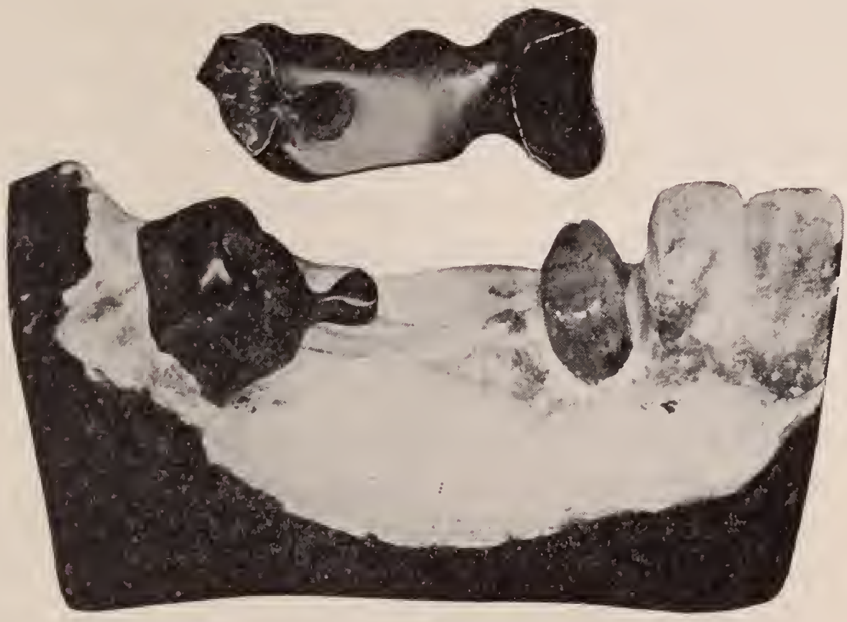

Fig. 2

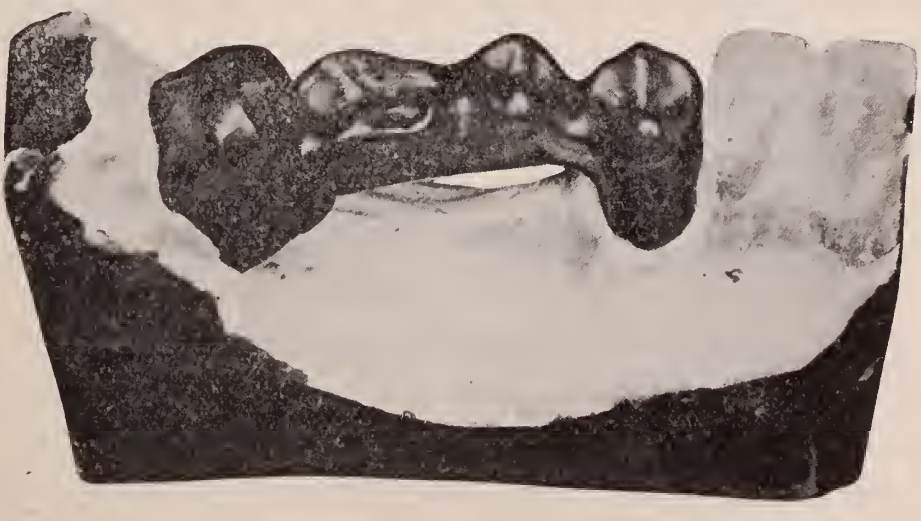

Fig. 3

In setting this case, all abutments are set at the same mix of cement, using cement in the locking device also. Place the molar abutment first and quickly follow with the rest of the bridge, using a curved-beak pair of pliers to firmly force the locking device together. Fig. 3 shows finished bridge.

Over two years of success with this method has led me to present it to the profession.

# SOME PROBLEMS THAT CONFRONT THE DENTAL PROFESSION*

BY W. G. EBERSOLE, M.D., D.D.S., CLEVELAND, OHIO

IN ADDRESSING you this afternoon it is not my intention to attempt to discuss many of the problems that confront the dental profession today. It is my thought to select three or four of the more important issues and present them to you in the light in which I see them.

As the most of you are aware, I have spent a number of years in the consideration and discussion of certain problems which I believed to be of tremendous importance to both the profession and laity. It has taken years to accomplish those things which should have been accomplished in months. It is surprising how blind humanity is to those things which tend to bring about the destruction of human life, giving a deaf ear to the words of warning uttered by those who foresee the danger. The people only give ear and awaken to a full understanding of such conditions when something appalling occurs as a result of their negligence.

That which is true of the people as a whole is true also of the various professions and classes of the people.

Of the professions which are blind or indifferent to the opportunities offered, I know of none more so than the dental profession. For a number of years a few members of the profession, scattered here and there, have been endeavoring to point out, to the profession as a whole, some of the grave problems which confront it and have been trying to induce its members to become active in the interest of both the profession and of humanity.

Impressions have been made here and there, but in spite of it all, we are swinging along with the same old stride that has marked our progress during the years that have passed; and methinks that nothing short of something of a startling or striking nature will bring to the profession a realization of its obligation to itself and to mankind.

It is my purpose to speak first, of mouth hygiene. Second of prevention of pain in dentistry. Third, some things which menace the profession.

## MOUTH HYGIENE

The greatest problem that confronts the profession today is the question of mouth hygiene. *As compared to this, all other issues sink into insignificance.*

It has been repeatedly brought to my notice that many members of the profession disagree with this statement. But, I *repeat* that the greatest problem confronting the dental profession today is Mouth Hygiene, and in comparison with this *all* others sink into insignificance.

Do not think for a moment that I would ignore or belittle other weighty problems. Much thought and consideration have been given to a number of them, but most of them have their strong advocates who have been teaching and preaching their doctrines for years, and your attention and my voice need not be occupied at this time in their consideration.

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*President's Address, Northern Ohio Dental Society, 1912.

With 97 per cent of the mouths of the public school children of this country in a faulty or diseased condition, with less than 10 per cent of the population of the United States giving any attention to their teeth other than extraction, with scientific experiments showing an average increase in working efficiency of 99.8 per cent plus on a class of twenty-seven children out of forty selected as having the worst oral conditions in a school of 846 pupils, I believe, nay, I know, that I am absolutely justified in my assertion as to the importance of mouth hygiene.

With these facts before us why is it that the dental profession remains so inactive and so indifferent in this matter?

It cannot be that it does not know, that its members do not understand. The leading oral hygiene men of the country have been telling the story over and over. So much, indeed, has been said along this line that I well know that a number of my hearers will be displeased that I should bring this before you at this time. But there is so much in this problem, as I see and know it, that I must ask you to bear with me while I present the question in a light which may be new to some of you.

On the night of February 15th, 1898, there occurred in Havana harbor an explosion which destroyed the Maine, the largest U. S. battleship, the pride of the navy, and two hundred and sixty-six lives were snuffed out without a moment's warning. (The entire world was startled, and the American people horrified by this occurrence.)

On April 15th, 1912, less than two months ago, there flashed throughout the world the report of that terrible disaster which caused the loss of sixteen hundred and thirty-one lives.

Great as were these losses, and great as were the sacrifices of life made in these terrible disasters, *I desire to call your attention to a more appalling sacrifice of life due to neglect, inefficiency and indifference.*

I want to tell you that *preventable diseases,* including accidents, ladies and gentlemen, *are destroying lives so fast in this country of ours* that disasters like those of the Maine and Titanic sink into insignificance in comparison.

In a booklet called "American Life Waste, and How It Is Increasing," prepared by Elmer E. Rittenhouse, Service Commissioner of the Equitable Life Assurance Company, and Dr. Eugene L. Fisher, Medical Director of the Postal Life Insurance Company, the statement is made that "at the present rate, from preventable causes over six million American lives will be needlessly destroyed during the next ten years."

Just what this means. It means six hundred thousand lives lost annually in this country from preventable diseases. Fifty thousand people each month! Sixteen hundred and sixty-six people every twenty-four hours! And yet people sit idly by and Congress so active in the Titanic investigation has been inactive, turning a deaf ear to those who have been standing at her door pleading for a hearing to bring to her attention the appalling sacrifice that is creeping on day in and day out, with scarcely an outstretched hand to rescue those who while struggling in the sea of life are being destroyed by preventable diseases.

Think of it, sixteen hundred and sixty-six lives needlessly destroyed every day, seventy deaths every hour, one every fifty seconds.

To make it more realistic, I will say that since I have been speaking eleven human beings, that might have been saved, have passed into eternity because of neglect.

You do not believe that statement. Some of you are saying, "Doctor, you must be mistaken. Such a condition could not exist in America without the people rising in revolt against its toleration."

I want to say to you that I am not mistaken. I am quoting facts and figures compiled by some of the leading life insurance organizations of the United States of America, whose business it is to study the ways and means of prolonging the lives of their policy holders.

Listen to the words of the men quoted above. "The destruction of an American battleship and crew startled the nation and precipitated the war with Spain; but preventable diseases and accidents, our perpetual enemies, destroy every day American lives equal to the crews of two battleships. Every three months they destroy American lives exceeding the combined forces of the army and navy of the United States. They destroy every year American lives exceeding the number lost in all our wars since the declaration of independence; but, the annual destruction of this vast army of American lives neither startles the nation nor precipitates a war for their protection."

In dealing with the great problem of preventable diseases, and the sacrifice and loss of life resulting therefrom, no other organ of the body plays so important a part as the mouth, and yet no other organ has been so neglected and ill considered as the oral cavity.

For every other organ of the body we have a specialist. For the mouth we have no specialist. The medical man has left this important organ in the hands of the dentist, and the dentist—left to himself—has become a "tooth doctor" and a "tooth doctor" only.

True, the medical profession has given us stomatologists, but they are few and far between. But, rare as is the stomatologist, rarer still is the man who sees and understands the mouth as a whole, for the stomatologist almost invariably ignores the teeth, leaving them to the dental profession.

To the dentist belongs the entire oral cavity. We should not be "tooth doctors," but "mouth specialists," *seeing, knowing, understanding, and treating all* lesions of the oral cavity.

I was about to say that dentistry does not know her obligation to humanity, does not realize the responsibility that rests upon her shoulders; but, to make such a statement as that would be to place her in a false position. Dentistry does know and does realize her responsibility. It is the members of the profession who are at fault. The members of the profession do not seem to know and understand all that dentistry means.

I will venture that if I were to ask this audience to name the most prevalent and destructive disease known to the human family today, 90 per cent of those present would answer "tuberculosis." Physicians will tell you that you are correct; but, I want to say to you this afternoon that you and they are mistaken, for such is not the case.

Dr. William Harper DeFord, of Des Moines, Iowa, states that tuberculosis is the most dreadful scourge of mankind; but Dr. DeFord is mistaken. Continuing, he states that "each year, in this country, enough people succumb to this malady to make eight armies the size of the standing army of the United States. That is not all, it is estimated that eight or ten times this number are affected to some extent by this disease.

"One death in every seven reported is from tuberculosis.

"Each year the world yields up 1,095,000; each day 3,000; each minute, two of its people, as a sacrifice to this plague."

I want to tell you that in spite of the great havoc which tuberculosis has wrought in this country, and notwithstanding the great inroads it is making upon humanity at the present time, it is but the "handwriting on the wall," as it were. It is but a visible declaration of neglected and wasted opportunities. It is but one of the fearful results of neglected oral conditions. The neglected human mouth; the mouth, wherein grow and develop those organisms which produce dental caries, or decay of the teeth. Dental caries, or decay of the teeth, is the most prevalent disease known to modern civilization, and is producing greater havoc in the human family today than all other diseases put together.

This is not an idle and ill founded statement; but a statement based upon actual facts and figures.

The mouth is also the greatest harbinger and the most extensive breeding place for other pathogenic micro-organisms.

At least 95 per cent of all tubercular infection takes place through diseased or ill-kept mouths. And, what is true of tuberculosis is true of almost all contagious or infectious diseases.

In the past, the care and attention given the mouth by both the laity and the profession has been with the principal thought and attention to beauty, while care and usefulness have been secondary considerations. But, today the world is fast awakening to the importance the mouth bears to the health and strength of mankind as well as to beauty.

I want to call your attention to the fact that the micro-organisms which produce tooth decay are just as readily transferred from child to child, and from adult to adult, as are the organisms which produce scarlet fever, diphtheria, pneumonia, or other kindred diseases; and, that mankind is far more susceptible to the inroads of this disease than to any other disease known.

With dental caries found in the mouths of more than 97 per cent of mankind today, and with the remarkable showing of an average improvement of 99.8 plus per cent made by the class of children selected from Marion school. With preventable diseases destroying more lives every twenty-four hours than were lost in the Titanic disaster; and with the human mouth recognized as the principal breeding place of pathogenic bacteria, and the entrance way through which most of the micro-organisms which produce preventable disease reach the system, I would ask this intelligent audience to pause for a moment and consider how far I was wrong when I stated that the greatest problem which confronts the dental profession today is mouth hygiene.

The members of the dental profession do not seem to realize or know the responsibility that rests upon them. They do not realize the importance that dentistry bears to the health and welfare of the world at large; and humanity has not had the slightest conception of what good dentistry means to it.

Dentistry was created to meet a great and long felt need. No profession has ever progressed more rapidly than has dentistry. But is it not surprising that the need it was created to meet instead of being met and checked has increased and grown many times faster than has dentistry.

The mouths of the people of the world have gone from bad to worse so rapidly that students of these conditions have become thoroughly alarmed at the progress that diseases of this organ are making.

Dentistry has not met the needs of the people, else deplorable conditions would not be going from bad to worse.

Dentistry is not wholly responsible for the deplorable conditions which exist, it is true. But certain it is that had dentistry been equal to the opportunities presenting, such deplorable conditions would not exist today.

I would not belittle the progress that dentistry has made. That is not my thought or purpose. It is my purpose rather to show the magnitude of the conditions we are trying to meet and the inadequacy of our forces to cope with the same.

Dentistry, as was perfectly natural, in the beginning cared for and corrected the faulty conditions existing.

Ninety-five per cent of all the efforts put forth by the dental profession until within the last three or four years have been for the purpose of repairing or replacing diseased or lost dental tissue—correcting faulty conditions —with but five per cent of the energy devoted to prevention of these conditions.

We have had the "cart before the horse," as it were, and the time has arrived when dentistry must right about face and devote the greater part of her time and energy to preventive measures, else humanity will turn from her in disgust and seek help from a source which can and will meet her needs.

I would not be pessimistic. I believe I am and have been one of the most optimistic of optimists. But I cannot pass without adding another word of warning. Dentistry must face about and devote most of her attention to the study and teaching of preventive measures, or just as sure and certain as I am speaking to you this afternoon she will lose the somewhat feeble hold she now has upon the respect and confidence of the public.

### SECOND PROBLEM.

The second problem I wish to present to you this afternoon is that of prevention of pain in dental operations. It is not my intention and purpose to devote much time to the discussion of this question. It is an old topic, but none the less an important one.

This organization was the first dental organization in the world to devote practically an entire meeting to the consideration of this important subject. (This took place during the speaker's second term as corresponding secretary), and I am positive that there is no dental organization in the world that has a greater number of its members who are devoting so much time to the study and practice of these humanitarian measures.

The failure of the dental profession to teach and practice preventive measures in their treatment and care of the oral cavity, together with their seeming disregard for the amount of pain inflicted in the performance of their operations, is responsible for conditions as we find them; and humanity will never receive and take dentistry into her bosom as she has medicine until such a time as dentistry comes to her with a service which is free from pain and torture.

Here, too, I wish to be as emphatic in my statement as I was in my statement relative to the teaching and preaching of prevention. Dentistry must come to humanity with service performed free from pain and torture else others will wrest from her the claim she now holds on the public.

### THIRD PROBLEM.

Third, I would speak of the dangers which menace the dental profession. Under the two heads of which I have spoken I have hinted that dentistry might lose her hold and claim upon humanity, and it is now my purpose to point out briefly wherein the danger lies.

Of all the professions none has as frail a hold on the public, and none is there whose services are so unwillingly sought as is that of dentistry.

Through fear and ignorance the public has come to hate the dental profession. With the public harboring such a feeling towards our profession, the first great danger that confronts us is that when humanity awakens to a full realization of the terrible handicap under which she is laboring at the present time, and learns that this handicap rests upon her almost wholly because of the inefficiency and indifference of the present dental profession, she will turn and demand immediate relief.

Then, if we are not able to give it—and we will not be if the present seeming indifference of the profession is to continue—then it is that humanity will turn, breaking the already strained conditions, and seek aid from a source which will spring up to meet her needs.

Already I have heard the cry from many sources—"Why is it that dentistry has permitted these conditions to exist? Why is it that dentistry has not been making a determined effort in years gone by to teach us why, how, and when we should care for the mouth?"

But recently the editor of one of the most important and influential dental journals of the country wrote me that his greatest fear was that there would be created a demand which dentistry could not meet and control, and counseled going slow in the education of the public until such a time as the dental profession was prepared and ready to meet the conditions created.

My reply was that he counsel not the oral hygiene men of this country to go slow in their attempt to give to humanity that to which she is entitled; but rather that he spend his energy and effort in an endeavor to create within the dental profession a full realization of her responsibility and have dentistry prepared to meet and handle conditions as they may arise.

Up to this hour almost every effort that the speaker has put forth has been to create within the dental profession a full knowledge and understanding of the conditions to be met and the resulting obligations in this connection.

While every effort put forth in this direction has met with greater response than have most other disciples of the cause, still we have fallen so far short of the goal we had hoped to attain that one must feel that much of the effort put forth has gone for naught.

The hour has arrived when the efforts of the leading oral hygiene men of the country will be turned towards doing their full duty to humanity, and dentistry must be prepared to handle resulting conditions.

Today we are receiving almost as many inquiries from public school superintendents and teachers as we are receiving from dentists.

The public is becoming thoroughly aroused and deeply interested in mouth hygiene, and this, too, before any thoroughly systematic effort has been put forth to bring about such a condition.

*The danger here lies in the fact that if dentistry does not step to the front and handle the question of mouth hygiene in the proper manner, the management of this all important work will pass into the hands of those less qualified to handle it wisely and judiciously.*

The second great danger to the dental profession today lies in the fact which I stated earlier in my address, that there were few, if any, oral specialists; and I want to say to you now that I know of no field in which there is a greater opportunity than that which is offered to the man or men who have the ability and good judgment to take up and make a specialty of the mouth as have other specialists of the eye, ear, nose, throat, heart, lungs, kidneys, liver, and other vital and important organs of the body; and, gentlemen, such a class of specialists is coming just as sure as we are assembled in this hall this afternoon. The extent to which it affects the practice of dentistry depends wholly upon the degree of activity that the dental profession puts forth to meet the immediate needs of humanity.

I am aware that there are a number of men in the audience who will consider this note of danger one that is "far fetched" and a condition which is not likely to occur.

Let me call your attention to a condition which exists in another field and is growing more distressing with great rapidity.

Earlier I spoke of the rapid progress made by dentistry and stated that in this dentistry leads all other professions. In making this statement I was either correct or incorrect depending upon whether the "Christian Science healers" may be considered a profession or not.

If they are to be considered a profession, then dentistry must take second place for no organization has met with more rapid growth and been as freely and kindly received as has Christian Science.

As a religion its success has been due to the fact that it offered a heaven that could be enjoyed here as well as in the herafter, and a God who knows only life, truth and love, and not a God who knows hate, inflicts punishment, or recognizes sin.

Its success in the healing art has been due to the fact that it has not made the mistake that did medicine of old and dentistry of later years.

These two professions begun their career by treating existing conditions, giving little or no thought to the cause which produced the same.

Christian Science on the other hand, began by ignoring the seemingly existing conditions and going back to the fountain head and removing the cause.

I would not have you believe, ladies and gentlemen, that I am a Christian Scientist, it might be better if I were.

From a religious standpoint the world was filled with fear and superstition; while from a medical standpoint the mind of the public was filled with fads and fallacies to such an extent that millions of dollars were spent annually for the so-called patent remedies recommended to cure all the ails and ills of mankind. Christian Science offered relief from these distressing conditions, and her plans and policies were of such a rational nature that humanity has been accepting them with such rapidity that great consternation has been felt in both the profession of theology and of medicine.

Already so heavily has the hand been placed upon patronage of the medical profession that thousands of practitioners are seeking relief in other fields. Already have we been asked to outline the opportunity that dentistry might offer to the medical men, and already have many of the leading investigators and research workers of the medical profession turned their activities to the study of this great question as a possible source of relief from the congestion which now exists in that profession; and again will I repeat that I know of no better or greater opportunity than that offered to those who have the ability and good judgment to enter the field as oral specialists.

One other source of danger, and I have ended. That is, the attitude of the members of the dental profession towards each other. Jealousy and envy are and have been the most potent influences in the prevention of progress.

Let a member of the profession become active in bringing about a change in existing conditions, and let his activities be such that they have created a considerable amount of attention and consideration and he is at once made the target for many a poisoned dart.

Some weeks ago I had the pleasure of listening to the Honorable William Jennings Bryan on the subject of "The Signs of the Times." In his talk he explained that a reformer was one who points out faulty conditions and then proceeds to advocate changes that will bring about a correction of these conditions. He classed himself as a reformer, and made the statement that the greatest trouble was that many reformers consumed much time in fighting or antagonizing each other.

He also stated that the attitude of the reformers toward each other reminded him very much of a story he once heard of the Australian burros as they ran wild upon the plains.

"The Australian burros when frightened form a circle with their heads to the center and their heels to the enemy, and when attacked begin to kick with such viciousness that an enemy is almost certain to be destroyed if it comes in reach."

He said that many of the reformers of the world reversed the wisdom of the dumb brutes and stand with their heads to the enemy and their heels directed to injuring and destroying each other. The lesson drawn was the wanton waste of life and energy which if directed in the proper channels would have accomplished much good in the world.

As I listened to the "burro" story and the application of it, I thought of how well it applied to the action of the dental profession.

I know of no profession or calling that has made such an effort to destroy or discredit those who sought to be its benefactors as has the dental profession. Both in the educational and commercial fields has this seeming mania for destruction been employed. Let me give you an illustration or two. I will not go back to the martyrs that have passed on. It is to the living that I would pay tribute this day. Take for example Dr. J. N. Crouse, the father of the Dental Protective Association, one of the greatest of benefactors, and one of the most invincible warriors in its behalf the profession has ever known.

Dr. D. D. Smith, father of Prophylaxis, who was abused and maligned until driven into a corner where he had to fight to maintain his honor. He put up such a fight that it forced upon the public and profession such a knowledge and understanding of his methods and theories that the profession was compelled, in self-defense, to adopt them.

In the oral hygiene field, take Dr. Richard Grady, the father of that movement; and Dr. John P. Corley, its greatest disciple and advocate.

In the inventive and commercial field take William Taggart, of gold inlay fame.

Come down to our own association—Dr. Weston A. Price and his cataphoric apparatus; the dental pyrometer and other inventions. Dr. Chas. G. Myers, with high pressure syringe and dental lamp. And, I could name many more the world over who are worthy of mention in this class.

Every man mentioned, however, has rendered both the profession and the public a signal and exceptional service.

AND WHAT HAS THE PROFESSION GIVEN IN RETURN?

In each and every case its members have swooped down like so many vultures and after taking all that each had to give, have formed a circle the direct reverse of the kind employed by the Australian burros and then have tossed their victims into this circle where upon the slightest cry for recognition or justice they are kicked and cuffed until at last *disheartened* and *broken* they withdraw from the field wounded and bleeding both in mind and body, without having received even so much as a word of thanks for the service rendered.

These men have ALL made mistakes, but back of these mistakes stands the service rendered. To have made no mistake means to have rendered no service.

Back of the mistakes stands the service rendered and back of the service stands the man who with the kindliest of spirit and purest of motives has sought to benefit both his beloved profession and suffering humanity.

Why then this inhuman treatment?

Gentlemen of the profession, one great danger today is that we are standing in a circle with our faces to the world and our heels directed at each other.

As a body we have failed to meet the demands of the times, and when here and there a member has stepped to the front he has been seized and tossed to the heels of the kicking circle.

Members of the dental profession, break up this accursed circle of indifference and inactivity. Step to the front, joining the men capable and willing to lead, and then shoulder to shoulder and with heads erect, march to meet the problems that confront the profession. March to meet and conquer opportunities such as have come to no other profession.

## UPPER AND LOWER MOLAR PORCELAIN CROWNS*

BY C. G. BAILEY, LANSING, MICH.

The upper tooth is ground as for any ordinary gold crown, and a gold band made; then the tooth is cut out on a bur with a small stone, to make room for a facing. The band is cut out as for an open-faced crown, then is replaced on the tooth and the gold band crowned even with the gum. Then an impression is taken with the band in position. Take impression and bite, make the model, place on an articulator as for a bridge; then fit the facing and build up in wax. Remove the cast. The facing can either be cast in position or may be made removable by baking it.

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*Clinic Michigan State Dental Society, 1912.

## BRIDGE WORK, USING GOSLEE FACING*

BY EDGAR L. GIFFEN, D.D.S., DETROIT, MICH.

This clinic illustrates the use of Goslee facings and the Tatham gold mesh. The object of the facing is to have a body of porcelain that will stand mastication and also will help to avoid the show of the gold. The idea of the mesh is to strengthen the wax copings and to facilitate handling the wax model without distortion. The mesh also helps to control shrinkage in casting, and also provides a good edge for burnishing.

The technique of using the mesh is as follows: Take the facing and press the mesh to place over the base, approximately, then remove and pour some hot inlay wax on, inside of the mesh. Then press to place over the facing, and with a small burnisher burnish the gold mesh over the edges. Remove and trim. Then take a sharp instrument and warm and force into the hole in base of crown through wax impression. Now take either iridio-platinum or clasp gold wire, Davis crown pin, and warm and force to place. Now the tooth is ready to put on the model. All the dummies are made in this way. Then take a piece of mesh and after carving away a little of the plaster model, press a piece of wax over where the bridge will be, remove and flow some warm wax in, then press to place again. Now put facings in place for articulation and attach to the base already on. Build up to the contour of the natural tooth, saddle effect. When all attachments are waxed to satisfaction, remove facings and invest ready for casting. After burning out the wax a higher pressure will have to be used in casting than if casting without the mesh. With the air pressure machine at between fifteen and twenty pounds' pressure. After casting, remove the casting, clean it, and it is ready to solder to the abutment.

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*Clinic Michigan State Dental Society, 1912.

## EASY METHOD OF REPAIRING DEFECTS IN GOLD CROWNS AND BRIDGEWORK*

C. O. DOBSON, D.D.D., GOSHEN, IND.

Mix mercury and filling gold the same as amalgam. Pack the mixture over the whole in the crown or defect in bridgework to be repaired. With soldering pliers hold the crown high over the gas flame so as to heat very slowly. As the mass reaches 250 degrees the mercury volatilizes, leaving the pure gold covering the whole or filling defect. This gold should be burnished to a smooth surface and the operation is complete.

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*Clinic Northern Indiana Dental Society, 1912.

**When your face spells failure it's no use talking of the glory of your faith.**

# THE MAKING OF AUTOGENOUS VACCINES FOR THE TREATMENT OF PYORRHEA*

BY GEORGE B. HARRIS, SC. M., D.D.S., DETROIT, MICH.

THE use of vaccines in the treatment of pyorrhea is not to take the place of the local treatment of instrumentation in any way. However, it becomes a very valuable agent when used to overcome the infection present and in maintaining a condition that makes the growth of bacteria impossible over a period of sufficient length to permit regeneration. It not only does this, but it also prevents the recurrence of pyorrhea after a cure has been effected by fortifying the individual against the bacteria. Protection against recurrence is as important as a cure itself. Stock vaccines may be used to do this, but it has been my experience that the Autogenous Vaccines give from 50 to 75 per cent better results.

The first step in making a vaccine of this kind is the obtaining of the pus. This should be obtained in as pure a culture as possible. Carefully remove all tartar deposits from the teeth; paint the tooth and gum with iodin and dry. On the following day remove all food particles, dry with alcohol again, paint the gum with iodin, and dry. Then carefully force out a small amount of pus from under the gum, collect on a sterile platinum wire and inoculate an agar tube. Allow this to germinate from twenty-four to forty-eight hours. If a pure culture has been obtained, which is generally the case if the preceding operations have been carefully done, the vaccine may be made directly from the first culture and several days saved; otherwise new cultures must be made from the predominating cultures in the initial tube.

Remove as many of the cultures as possible, care being taken not to take up any agar with the cultures. These are now transferred to a tube containing distilled sterile water. This is shaken vigorously to break up all clusters. A centrifical machine should be used for this purpose, but if one is not to be had it can satisfactorily be done by hand. One half a cubic centimeter is now drawn up and transferred to another test tube. This is used in the determination of the number of bacteria we may have in the concentrated solution and is not made into vaccine. To this is added two cu. cm. of water to make the counting easier and more accurate. About half a cu. cm. of this diluted solution is now drawn up in an opsonizing pipette and an equal amount of normal blood taken directly after. This is blown out on a slide and mixed. A drop is then placed on a cover glass, dried, mounted and stained. Place the slide on the counting chamber and count the corpuscles and germs in the successive fields until at least 250 corpuscles are counted. Since there are 5,000,000 corpuscles in a cu. mm. of blood, by a simple proportional equation we can determine the number of bacteria in the dilute solution. By multiplying the number of germs in the dilute solution by the number of times it was diluted, we determine the number of germs in the concentrated solution per cu. mm. Since there are 1.000 cu. mm. in a cu. cm., by multiplying the number per cu. mm. by 1.000, we determine the number per cu. cc. For example: Supposing we counted 250 corpuscles and 50 bacteria. Since we know that there are 5,000,000 corpuscles to one cubic millimeter of blood, the following proportion is established: 250 : 5,000,000 : : 50 : X.

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*Given as a clinic before the Michigan State Dental Society, 1912.

Solving this proportion, we find there are 1,000,000 bacteria per cu. mm. Since there are 1,000 cu. mm. in a cu. cc., we find 1,000,000,000 bacteria to each cu. cc. in the dilute solution. Since we diluted the solution four times, there are 4,000,000,000 bacteria to each cu. cc. in the concentrated solution. The vaccine is now ready to be standardized. It is first diluted to the strength we wish to have it; heated at 60 degrees for an hour, then 4 per cent tricresol added to prevent contamination, and sealed.

Any loose tissue may be selected as the site of injection. The most important things to look out for are:

1. Be sure that the solution is sterile.
2. Absolute cleanliness of the skin at the site of injection.
3. Use great care in avoiding veins.
4. Be sure the count is reasonably accurate.

## PORCELAIN MOLAR CROWNS*

BY G. LEON HAYWOOD, D.D.S., DETROIT, MICH.

Prepare the root same as for the Davis or Logan crown, enlarge at least two root canals, grind S. S. White countersunk tooth, pins removed, to fit approximately the end of root, leaving room for cast base. After fitting posts, take impressions of end of root with inlay wax, using crown to force wax to place; carve off all surplus wax; remove crown and wax with pins attached; invest wax, and cast. After casting, cement crown to casting and you have a very natural appearing crown.

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*Clinic Michigan State Dental Society, 1912.

Smile a smile;
While you smile,
Another smiles,
And soon there's miles and miles
Of smiles. And life's worth while
If you but smile.

—Jane Thompson.

# DELETERIOUS EFFECTS OF MERCURY IN RUBBER PLATES*

BY DR. S. T. KIRK, KOKOMO, IND.

I want to explain the harmfulness or deleterious effects of the mercury that we have in rubber plates, not only upon the roof of the mouth from the plate coming in contact with it, but upon the whole system. I have noticed this for a great many years. I have noticed, and so have you, how red a mouth will get sometimes when wearing a plate. By looking at the mouth I can tell what kind of a plate a person is wearing, from the condition there. We have a redness which comes from the heat of the rubber, but it is not all that by any means. We also see what is termed by the homeopathic as the dynamic effect upon the system. I have changed plates for no other reason than because they had rubber plates that contained mercury. In several instances I have had patients come back to me in three months and say, "What did you give me that medicine for?" One woman says, "I got well from the trouble that had existed a long time." This is a typical case. Hundreds have said the same thing. There may be some vaginal or other trouble. Patients do not have a bit of that trouble remaining inside of six weeks after they take my medicine which I give them to combat the mercury in their system. After putting a plate in their mouth that has no mercury in it, and counteracting the mercury in the system, they have no further trouble. A woman came to me who had a good set of teeth, and they were all right except for the red rubber. I told her to wait three weeks for her mouth to get well before I would put in new teeth. At the end of three weeks she said she was so much better she would wait another three weeks. Another lady came in to have lower teeth put in. she said, "I cannot go without my teeth at all, and I want my impression taken right away." "No," I said, "I am not going to take the impression for about two weeks, and I want you in the meantime to leave that plate with me." "But I cannot go without it," she said. I persuaded her to go home, and in two weeks I put her upon my books for a full set of teeth. The red rubbers contain mercury, but there are rubbers which have no mercury. All cases will not be affected by it. A bilious temperament will not be affected so much, but persons who are nervous and weakly will be affected by it. As already stated, I have had patients come to me in a few months and ask me what I gave them that medicine for. I gave it to counteract the mercury. They say, "Do you know what was the matter with me?" I say, "No, I am not a physician and do not know, only I knew you were poisoned by mercury in your rubber plate, and I removed it and put in a plate which has no mercury," and they get well from their troubles, especially those peculiar to women—womb troubles and others. They have gotten entirely well. I could tell a hundred cases of that kind.

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*Clinic Indiana State Dental Society, 1912.

## A CASE FROM PRACTICE*

BY LEO F. BANGHART, DETROIT, MICH.

This case, from practice, was a left lateral root prepared as if making a Davis or Logan. Instead of porcelain being used, a crown was taken from a previously extracted left lateral and adapted by casting a base of pure gold. The color and mould was practically the same and the root, being cut well up labially, eliminated the presence of gold. It made a beautiful case and not easily detected.

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*Clinic Michigan State Dental Society, 1912.

## CAST GOLD CROWNS*

BY E. R. KIBLER, D.D.S., INDIANAPOLIS, IND.

After preparing the root properly, take 32-gauge, 22k gold, and make a band to fit the root. Then solder a flat piece of gold across the top, put on the wax, return to mouth, have patient bite, then melt excess on sides of crown to get your contour and occlusion, and then carve up the cast.

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*Clinic Indiana State Dental Society, 1912.

## APPLICATION OF PIVOT TEETH*

BY W. O. VALLETTE, D.D.S., GOSHEN, IND.

In fitting pivot teeth to roots endeavor to fill the enamel outlined, which gives a V-shape to the porcelain tooth and wide shape to the root, and by fitting these carefully it prevents the rotation of the pivot teeth on the root. It also adds strength and prevents splitting and follows Nature the same as enamel does on the natural tooth.

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*Clinic Northern Indiana Dental Society, 1912.

**Have a purpose. No one ever reached great things without trying for them. Thoughts of what is great, love for great ideals, daily acts done in a great spirit, prepare the hero's hour and bring it to him. Purpose makes or mars life. Purposelessness ruins life.**

# THE FIFTEENTH INTERNATIONAL CONGRESS ON HYGIENE AND DEMOGRAPHY*

BY HOMER C. BROWN, D.D.S., COLUMBUS, OHIO

YOUR program committee requested that I make a report on the Fifteenth International Congress on Hygiene and Demography, and in compliance will review some of its history, as well as some of the points that particularly impressed me.

This Congress was organized about sixty years ago and it has been customary to meet every three to five years. This is the first session that has been held in the United States; all previous meetings have been held in the capitols of the important foreign countries, and upon invitation from the country acting as host. The expense has been largely provided by governmental appropriations, although a part of this is sometimes obtained by subscriptions from public-spirited citizens, as well as receipts from membership fees. The estimated expense of this Congress and Exhibition just given is $113,000, and it is expected that such public subscriptions will meet all above $60,000, which has been provided by the United States government.

The active membership fee was $5.00 and included usual membership privileges; also a copy of the complete proceedings, which I was informed will cost about $6.50 per set for publishing and delivering. Associate membership fee was $2.50 and applied only to such ladies as accompanied active members and entitled them to invitations to such entertainment as had been arranged for the lady visitors.

In granting authority to invite this Congress and in planning for the many details it was necessary for Congress (U. S.) to take several official actions, the first of which was Feb. 28, 1904. February 26, 1907, a joint resolution was passed, authorizing the President to invite the Fifteenth International Congress on Hygiene and Demography to meet in the United States in 1909 or 1910. Congress later authorized the postponement of this meeting until Sept. 23d to 28th, 1912. To further impress the fact that this was under strict governmental control, Congress, January 24th, 1910, authorized the President to invite the several states to co-operate in making this meeting a success.

Twenty-six federal bureaus participated in the exhibits, besides there were various state, municipal and industrial exhibits. These exhibits have been restricted to the country in which the Congress is held. Thirty-three countries are affiliated with this Congress. Twenty-eight were officially represented on the stage at the opening session and responded, in their native tongue, to the address of welcome, and it was estimated that there were 3,000 in attendance.

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*Read before the Columbus Dental Society, October 29th, 1912.

The responsibility of arranging for this Congress was largely in the hands of a committee on organization consisting of ninety persons and representing all sections of our country, as well as very nearly representing all callings in life which have to do with health problems, educational questions and statistical records. Very naturally the medical profession should have been more largely represented upon this committee than any other profession or vocation, but I am not convinced of the necessity for more than two-thirds of this number being medical men, especially if it was this that in any way was responsible for the dental profession not having representation on this organization committee. However, I am not inclined to think that the number of medical men was in any way responsible for this, neither should it be assumed that our relation to matters of health is not receiving more consideration than the personnel of this committee would indicate. I am not advised as to where the next session will be held, but it is to be hoped that the dental profession will be recognized in the future in the appointment of any such large committee; and if this criticism should in any way be responsible for such recognition I shall feel that it has not been made in vain.

Dr. Henry P. Walcott, Boston, Mass., and Dr. John S. Fulton, Baltimore, Md., were respectively President and Secretary-General of the Congress. President Taft was elected as Honorary President and a Vice President was elected from each of the foreign countries represented, as well as a couple of additional Vice Presidents, Surgeon-General Rupert Blue of the Public Health Service, and Dr. Herman S. Briggs, New York city.

President Taft delivered an address of welcome and received the guests at the White House on the afternoon of the first day of the meeting. He was enthusiastically received and made an appropriate and interesting address. Referring to the necessity for a bureau of health, he said: "We need to develop, under governmental auspices, a bureau or a department in which the funds of the government shall be expended for research of every kind useful in the practice and enforcement of hygiene and preventive medicine. That something of this sort may grow out of the present United States Public Health Service there is reason to believe, but it will need far greater appropriations and a widening of its scope of duties before it shall have filled the place that the medical profession of this country has a right to expect the general government to create in the progress of hygiene and demography."

Referring to the subject of tropical hygiene, President Taft said: "Our responsibilities in Cuba, Porto Rico, and the Philippines, and now on the Isthmus of Panama, have so enlarged our knowledge of the possibilities of successful sanitation under the most burdensome conditions, and have so impressed both professional men and the laymen at all familiar with the conditions with the necessity for more rigid and comprehensive health laws and a stricter enforcement of them for the general public good, that if the Spanish war resulted in nothing else it was worth greatly more than its cost in this useful development of one of the most important functions that modern government has to discharge, as well as in making clear the need of an additional branch of general education in the matter of hygiene of the home and the individual."

In this connection it may be interesting to mention that when President Taft first recommended establishing a Bureau of Health, in his message to Congress in 1908, the Ohio State Dental Society was in session. Appreciating the benefits of such a department and taking advantage of the fact that we were in a fortunate position to give this an early endorsement, I offered the following resolution:

Whereas, In recent years there has been a decided and far-reaching movement in both the medical and dental professions toward establishing prophylactic and sanitary measures, to the end that disease and insanitary conditions may be reduced to the minimum, and

Whereas, The President of the United States, in his recent message to Congress, recommends the creating of a National Bureau of Health; therefore be it

*Resolved*, That the Ohio State Dental Society most earnestly endorse the establishing of such a bureau and pledges its loyal support to such a bill; and be it further

*Resolved*, That the secretary be and is hereby instructed to mail a copy of these resolutions to President Taft, the Ohio Senators and Congressmen, and that the same be spread upon our records.

This was unanimously adopted, and I am of the opinion that the Ohio State Dental Society was one of the first, if not the first, State organization to endorse the proposed Bureau of Health.

Press reports of the last few days convey the information that Congressman James M. Cox, in his campaign for Governor, has taken another progressive step and emphasized the importance of better safeguarding the health of our citizenship and thereby save, in lives and money, the great loss which occurs annually from preventable diseases and through ignorance in observing ordinary hygienic precautions.

The program for this Congress was an elaborate one and many and varied subjects were presented by persons of recognized qualifications in their particular specialty. This was divided into nine sections, the first eight pertaining to various phases of Hygiene and the last, or ninth, to Demography. From a dental viewpoint Section 3, to which was assigned Hygiene of Infancy and Childhood and School Hygiene, was probably the most interesting.

The officers of this Section were: President, Dr. A. Jacobi, New York City, President of the American Medical Association; Secretary, Dr. Luther H. Gulick, New York City, Director Department Child Hygiene, Russell Sage Foundation.

It was before Section 3 that the papers on Dental and Oral Hygiene were presented, as follows:

"The Results of the German Central Committee in the Movement for Dental Work in the Schools of Germany"......................
......................Zahnarzt Dr. Konrad Cohn, Berlin, Germany

"Dental Hygiene for Pupils of Public Schools"..................
..........................Dr. S. Adolphus Knopf, New York City
"The Human Mouth in Its Relation to Public Health"............
..........................Dr. William G. Ebersole, Cleveland, Ohio
"The Hygiene of Children's Teeth"..Dr. William H. Potter, Boston, Mass.

Unfortunately our profession was not very largely represented, especially when we consider that there were seventeen German dentists in a party of 250 Germans in attendance, consisting principally of physicians and scientists. However, these German dentists had understood that this Congress and the National Dental Association would be held simultaneously and were greatly disappointed when, at a late date after arrangements had been made, they ascertained that such was not the case. The presence of so many foreigners is an indication that, having come in closer contact with the former sessions, they were able to more fully appreciate its importance. But it was unfortunate that more of our scientists, educators, physicians, dentists and all others who are interested in protecting the health of our present generation and advancing civilization generally were not present. In view of this, and the fact that the National Dental Association had met in Washington, September 10th to 13th, I consider that we had a creditable attendance.

It would seem, in the rush of other matters, the appointing of delegates from the National Dental Association was overlooked, and appreciating the importance of having official delegates from this Association, I wired the President, suggesting that he appoint five or ten delegates to this Congress. He replied by wire, appointing me as chairman of a committee with authority to select such others as were thought best.

It was my first intention to select a limited number of persons who were planning to attend this Congress, and two or three selections were accordingly made. However, it was later thought best to appoint every member of the N. D. A. who was present and not otherwise officially delegated. This statement was made on two occasions when some of the dentists were together discussing affairs. Carrying out this plan, the following constitute such official delegates: Drs. B. Holly Smith, Baltimore; Burton Lee Thorpe, St. Louis; P. B. McCullough, Philadelphia; George S. Tigner, Atlanta; W. Ernest Walker, New Orleans; J. P. Corley, Sewanee, Tenn.; C. A. Hawley, Washington; W. Smith Frankland, Washington; J. A. Gorman, New Orleans; E. A. Bogue, New York City; William L. Northen, Talladega, Ala,; S. P. Cameron, Philadelphia; J. D. Towner, Memphis; B. Holly Smith, Jr., Baltimore, and the writer.

The National Mouth Hygiene Association appointed the following delegates to represent their Association: Drs. W. A. Evans, Chicago; Horace Warren, Missouri Valley, Iowa; Holly V. Brockett, Kansas City; W. Smith Frankland, Washington; Wm. Donnally, Washington, and A. M. Nodine, New York City.

Some months ago Governor Harmon appointed five physicians and five dentists as official delegates to this Congress from Ohio, and am pleased to report that four of the dentists thus appointed were present, as follows: Drs. L. L. Barber, L. E. Custer, Sidney J. Rauh and the writer. Governor Hadley of Missouri appointed Drs. Burton Lee Thorpe and Holly V. Brockett as official delegates from Missouri and representatives of the dental profession.

Dr. W. A. White, Phelps, N. Y., was present as a delegate from the New York State Board of Health. Dr. Henry L. Adler, Dallas, Tex., as the official representative from his city, appointed by the mayor. In addition to those officially represented on the program, Dr. M. H. Fletcher, Cincinnati; Dr. F. K. Ream, Chicago, and Dr. C. W. Hutchings, New York City, were in attendance. No doubt others from a distance were there, besides many of the Washington dentists who took advantage of the favorable opportunity to attend the sessions and inspect the exhibits.

The dentists in attendance at this Congress held three informal conferences. The first and second was called in order to discuss matters of common interest in connection with the Congress, and the last to show every possible courtesy to the foreign dentists who were present. At this last meeting a number of the Washington dentists were present and provided refreshments, but most of the foreign dentists had gone to Philadelphia and did not return until after we had adjourned.

At these conferences the question of requesting the Congress to provide for an Oral Hygiene Section, for future meetings, was quite generally discussed. A resolution was passed stating that it was the sense of those present that such a section would be advantageous and should be requested, but the resolution provided that the question be referred back to the organizations thus represented for further consideration. This would mean the foreign dental organizations, the National Dental Association and the National Mouth Hygiene Association.

The exhibit held in connection with this Congress was extremely interesting and distinctly educational. I understand that this was kept open for three weeks, but there were many features in this connection that would be of great educational value if it could be made a permanent exhibit and sent from one section of the country to another. A number of the states had exceptionally interesting exhibits, and I was particularly impressed with those from New York and Indiana. It was disappointing to find that Ohio had no official exhibit, but there were several interesting ones of local significance. For instance, the Association of Charities and Corrections, the Babies' Dispensary and Hospital and Oral Hygiene Clinic, from Cleveland; the Cincinnati Health Department, which included their Oral Hygiene work; and the Board of Education of Toledo. In addition to the Oral Hygiene exhibits from Cleveland and Cincinnati there were similar exhibits from the New York State Board of Health, Bureau of Health of Philadelphia, the Girard College of Philadelphia, National Museum of Washington, Rochester, N. Y., and possibly others.

The Forsyth Dental Infirmary of Boston exhibited an interesting model of their institution, which attracted a great deal of attention. The Girard College of Philadelphia is doing pioneer work in providing dental services for the boys attending their college. They have employed three dentists who devote their entire time to the dental needs of their students and they have thoroughly equipped dental offices in their institution for this purpose.

This Oral Hygiene exhibit occupied about 600 square feet of floor space and 300 square feet of wall space and presented the various phases of the work. Many of these illustrations were presented as transparencies, and in this manner they were much more easily studied. There were two complete and up-to-date dental offices exhibited, and I understand that this very favorably impressed Dr. Oscar Dowling, President of the Louisiana Board of Health, and that he contemplates adding such an office to his already complete "health train." Dr. Dowling had this "health train" at Washington and the entire country is deeply interested in the success of his work, which has been phenomenal. The success of this Oral Hygiene exhibit is largely due to the efforts of the Oral Hygiene committee of the National Dental Association and the National Mouth Hygiene Association, but much credit is due to Dr. W. Smith Frankland, Washington, D. C., for the interest that he took in looking after the many details in this connection.

There were many stereopticon lectures given in this Exhibition hall, in rooms especially provided for this purpose. The National Mouth Hygiene Association presented daily their "moving picture" entitled, "Toothache," which was prepared with a view of educating the public to appreciate the importance of Oral Hygiene.

The only unfortunate thing, as I observed it, was the fact that such elaborate and expensive preparations could not be viewed and studied by more persons and thereby open additional avenues of disseminating this knowledge to the greatest possible number. I am firmly convinced that the funds of any State could not have been better spent than to have had a representative of their health department in attendance at this Congress. Likewise, I consider that the important municipalities, within a reasonable distance, could have judiciously gone to the expense, if necessary, of having a representative from their health department and board of education in attendance. The representative from the board of education could consistently have been the medical inspector, superintendent of schools or some official of the board. Some may criticize such expenditure, but such criticism would largely be through ignorance. In my opinion such expense is economy in the end, as, in many instances, it enables those in authority to determine the best and safest course to pursue without more or less experimenting, which is usually quite expensive.

This is in keeping with a suggestion made some two years ago to the State Highway Commissioner, following a motor trip through the southern part of our State. Several counties were traversed in this trip and, to my surprise, I found in Jackson county, which, as some of you know, is one of our hilly counties, twelve miles of the finest limestone pike that I have ever seen, and it had been built eleven years. Inquiry developed some information regarding the construction and up-keep of this pike and the fact that the citizens of this county had elected a good man county commissioner and appreciated his services by re-electing him for two or three terms. My suggestion to the highway commissioner was, that it would pay his department to study such conditions and methods of road-building; and further, that it would be money well spent if each county in the State would send one of its county commissioners and county surveyor to Jackson county to make like observations and apply, when conditions were favorable, in the construction of roads in their respective counties.

Some mistakes are very easily "covered up," but poor road-building is not one of these. As an evidence of the truth of this statement, you need only to travel a short distance in most any section of Ohio, or any other State, to be fully convinced.

Mistakes in hygiene, sanitation and education are not so easily observed except by persons of experience, but this fact increases rather than diminishes its importance. On the other hand, mistakes in road-building may be corrected in later years, while an opportunity *may never* present itself to correct mistakes in matters of health, and loss of educational opportunities are seldom if ever regained, and if so it is under an increased handicap.

The connection between road-building and health questions may seem very remote, but the points involved are somewhat similar, at least in the way in which I have endeavored to present them, namely: In this day of rapid progress, strong business competition and centralization of energies, it is *results* that count. Qualification and faithful conscientious service are two important factors in producing results, and to study the exhibits at this Congress and the road conditions described cannot fail to stimulate those who are already competent and greatly aid those who may not measure up to the high standard of the present day requirements. Therefore, while we may be very energetic in our endeavor to secure competent and honest public officials, it is quite important that we should encourage co-operation and the exchanging of practical observations, to the end that mutual benefit may result therefrom. It is only a very rare and exceptionally competent person, or the other extreme, who will admit in advance that it is useless to seek further knowledge, and such admission should be considered as the "first sign of distress" and relief measures applied at the earliest opportunity.

**"Some people would rather hear something mean about other people, especially if they're prosperous, than listen to the greatest opera ever sung."**

# THE DENTIST AND THE TUBERCULOSIS PROBLEM*

BY J. W. SHANKLAND, D.D.S., M.D., ST. LOUIS, MO.

TWO of the problems now confronting the medical and dental world are those of tuberculosis and cancer. These diseases demand constant study and experimentation because of their enormous death rate. We know full well that if they are recognized early, before they have depleted the human economy to such a degree that the case is hopeless, many lives can be saved.

The subject of tuberculosis, which has attracted the attention of the public for the last decade, has literature enough under its headings to keep one man reading for a decade to come. The subject of cancer has also hundreds of books and papers to its credit. The early recognition of these diseases and their differential diagnosis are the prime features now for study and discussion. The subject of cancer, as it concerns the dentist, I leave for some member of this Society to write upon. The subject of tuberculosis I shall attempt to discuss.

Professor Koch discovered and demonstrated to the world the bacillus causing the disease—its life, its staining qualities, its power to fulfill his four postulates. He placed it as the undoubted cause of the disease, and so it stands today.

The death rate from tuberculosis is estimated at from 7 to 10 per cent of all deaths. I wonder what per cent of the dentists' patients are tubercular and how many bacilli he has blown directly at him every day? How many does he get on his fingers from the rubber dam, and how many transmitted by himself from his patients to himself? I wonder how many patients would show the bacilli if their sputum should be saved and thoroughly examined. I wonder how many of the pus pockets about the teeth affected by pyorrhea alveolaris would show the tubercular bacilli microscopically. Here are suggestions for some research work right along these very interesting lines which could be carried on by any one of your profession.

The *mechanical* side of the dental proposition so overshadows the real medical and surgical aspect that I begin to wonder what the profession is going to do for itself in the future. Could it be possible that some day there will be two distinct schools or classes of dentists? The one, the medical diagnostician and pathological man, and the other the mechanical expert? The idea is not a bad one, because all the fine mechanical work goes for naught if the pathological conditions are not removed and healthy tissue known to be about the tooth, for its future protection. A patient would be better off if he had to be passed upon by an expert dental diagnostician before a mechanic should be allowed to perform the work. This would eliminate many a dental parlor and make better men of both the stomatologist and the mechanic. The survival of the fittest would then prevail.

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*Read before the St. Louis Society of Dental Science, 1912.

Tuberculosis will attack mucous membrane, bone, joints, lymph nodes and channels, bursa and muscle, all of which are found in the oral cavity, or its framework, or related thereto. So you must be interested in all these structures.

The dental practitioner has an exceptional opportunity for the study of the diseases of the mouth, throat and face of adults. The fact that his patients do not come to him for this purpose or for him to treat such diseases, but to fill or extract a tooth, leads him to rather let these conditions slip by unnoticed if he is right busy. He examines the teeth hurriedly for cavities or other conditions requiring a mechanical means of repair. While the mechanical work takes up the greater part of the dentist's time and is his principal source of income, the treatment of disease is in his sphere when it relates to the tissues within his province. The pharynx and larynx should be within his scope and he should be able to use mirror and reflector to aid in diagnosis. When tuberculosis, syphilis or cancer are seen in these parts they indicate immediate treatment from the patient's standpoint (often surgical interference) and extra precaution, from the dental practitioner's standpoint, relative to instrumental and personal cleanliness and care.

As the treatment of disease is governed by the *diagnosis,* it first behooves us to gather the items of history and the category of symptoms before we draw the final conclusions as to cause, treatment and effect. A *systematic* method of doing this should be adopted. In my practice I use the following general history form:

### GENERAL HISTORY FORM

*Family History:* Age—previous diseases of hereditary nature in family—father, mother, brothers and sisters—number of members in family and if any dead, cause—age; inquiry as to lues, tubercular processes, nervous disorders, malignant neoplasm, etc.

*Personal History:* Age—children, number and health; if a female, age at appearance of menstrual flow, regularity and any disorders, miscarriages, etc.

*Previous Health:* Diseases of childhood and all serious diseases, injuries, etc., up to present trouble; operations if any, cause, result.

*Habits:* As to usage of tobacco, alcoholics, narcotics, regularity of meals and sleeping, with number of hours, character of food and method of eating—amount and kind of labor, occupation, station in life, social condition, and sexual habits.

*Present Trouble:* Date and manner of onset, prodromal symptoms, course which disease has followed till present time.

*Present Condition:* As to eating, sleeping, urination, bowel movements, vomiting and gastric disturbances; cough, dyspnea and chest disorders, pain, fever, eyesight, and subjective, cerebral nasal, ear, mouth, chest, abdominal, nervous symptoms—condition of the special senses.

*Physical Examination:* External appearance, development, color, figure, height, weight, attitude, facial expression, skin appearance, swellings, conditions of limbs and joints, wounds and injuries.

*Digestive Apparatus:* Consisting of condition of mouth, tongue, gums and pharynx, and the abdominal organs, stomach, contents and feces.

*Respiratory Apparatus:* Nose, mouth, larynx, lungs, inspection, palpation, percussion, auscultation, mensuration, cough and expectoration, condition of the voice, dyspnea, etc.

*Circulatory Apparatus:* Examination of the cardiac area, veins and arteries, pulse, and examination of the blood, appearance of the skin, and mucous membranes.

*Rectal Examination:* Pain, condition of parts external and internal. Tumors palpable, prostrate, and tumors in Cul-de-sac, etc.

*Urinary Apparatus:* Examination of the kidneys, ureters, and bladder, examination of the urine and the genital organs; previous urinary history taken carefully.

*Social Conditions:* Front or rear rooms, number of rooms and occupants. Beds, light, heat, ventilation. Condition of plumbing, sewerage; damp or dry. Condition of beds, linen. Bath or no. Hygienic habits of patient.

*Nervous System:* Intelligence, subjective nervous phenomena, gait, station, reflexes, paralysis, tremors, pain, convulsions, headaches, nerves of special sensation, disturbances of sensation of speech and the special sense organs.

*Laboratory Work:* Examination of fluids obtained by punctures and bacteriological examination of blood, sputum, secretions, exudations, etc.

### DIAGNOSIS—TREATMENT

The oral cavity is one of the most important parts of the anatomy to be studied for symptoms. Here the mucous membrane shows a variety of colors—spots, herpes, pustules, ulcers, membranes, etc. The consistency of saliva, the amount, the character and the bacterial manifestations require due consideration.

Most every disease has at least one oral symptom. In considering the tubercular manifestations of the mouth, it may be said that they are very few and an original focus in the mouth is seldom to be found. In about all tubercular conditions the primary focus is in the lung and the oral symptoms are secondary.

The buccal mucous membrane of the mouth harbors numerous harmless bacteria, as well as putrefactive and pyogenic bacteria in vast numbers. They are there and ever ready to infect wounds of the surrounding tissues. The variety of bacteria tend to form a mixed infection rather than a simple one. They gain entrance into the various tissues through dentition ulcers, typhoid ulcers, syphilis, tuberculosis, gonorrhea, diphtheria or alveolar abscess due to pulp putrefaction and sometimes by mercurial, arsenical, phosphorus or other poisoning. The lymph nodes and channels are in close relation to the mucous membrane and soon the infection may be taken up and carried from the atria of entrance in the oral cavity as far as to the soles of the feet.

The work of Koch in '82 made clear that the changes in tissue thought to be caused by separate diseases was only the various manifestations of the same disease which he proved to be tuberculosis.

A *tubercle* is formed first by the deposit of the tubercle bacilli in the tissue; these multiply slowly and incite a number of tissue changes, beginning with a degeneration of the surrounding tissues, followed by a putrefaction of healthy connective cells, leucocytes and giant cells, forming grayish cellular nodules, which are called tubercles. These tubercles, single or en masse, may undergo calcification or regress and form ulcers or watery, thin, tubercular pus abscesses.

Having in mind these facts, let us look into the mouth of a patient seated in the chair. The teeth have been thoroughly examined and all cavities enumerated upon the chart, the material to be used decided upon and the price satisfactorily arranged (cash deposit in hand). This done, we can feel free to inspect the mucous membrane. We notice a superficial inflammation of the mucous membrane—it looks raw. We wipe it off with a bit of cotton and find only serous exudate present. This is not tubercular, but a *simple catarrhal condition.*

On the opposite side we see a similar condition covered with a fibrinous sero-purulent or sero-hemorrhagic coating. This has progressed some further and is a *croupous inflammation,* not tubercular but prime to become so if pulmonary trouble be present. In another case the condition has gone deeper and destroyed the mucous membrane and is into the connective tissue. The membrane is yellowish-white, mixed with brown and blood, with a marked area of inflammation about it. It shows streptococcus and other pyogenic bacteria, which identify it as a *pseudo diphtheretic* or a diphtheroid condition.

In any of these conditions the lymph glands and channels may take up infection, culminating in tonsillor abscess, follicular abscess or intestinal ulcer. However, the infections of the upper air passages never alarm the surgeon as do the phlegmonous forms of inflammation, or the diseased lymphatic glands or the general infections with bacteria. The very dangerous forms possible to result from a comparatively simple condition in the mouth are: Meningitis, Ludwig's angina, mediastinal abscess, abscess surrounding the oesophagus and even suppurative peritonitis or septicemia or pyemia.

Should we see a round or oval nodule on the lips or tongue, about the color of boiled ham, raised and having an indurated area about it, painless, varying in size from that of a ten-cent piece to a quarter, we then say it is most likely a Hunterian chancre of syphilis. Pale raised patches in the mucous membrane of thickened epithelium and may be accompanied by ulcerations on the tongue are mucous patches sometimes called leucoplakia.

Taking a look into another mouth we note small, miliary nodules or nodular infiltration from which extremely painful ulcers may result. The floor of these may be granular, yellowish color, with undermined corroded edges which are not indurated. Small nodules are found in the surrounding tissues as well as small scattered ulcers. A history of a lung complication makes plain the diagnosis of tuberculosis.

It is rare that the primary infection is found in the mucous membrane, tongue, mouth, lips or nose. Ulcers of this character are much more common on the pharynx, tonsils or larynx than in the mouth. Cuts from edges of decayed teeth are the principal primary source.

*Tuberculosis of skin* about the nose and mouth extends from the mucous membrane of these parts. Picking the mucous membrane of the nose with the finger nails is the common source of this disease.

Ninety per cent of the cases of *glandular infection* are tuberculous. The glands of the submax triangle are the first to enlarge, as they drain the lymphabes from the face, mouth and pharynx.

*Tuberculosis of the bone* occurs follows some injury or anything producing an osteomyelitis, the bacilli being carried from some other portion of the body where tuberculosis is present. The infection may occur first in the joint and secondarily attack the bone. There is always a possibility of the infection coming through the lymphatic channels.

An infected embolus may lodge in some of the blood vessels of bone and the infected areas follow. With these local conditions present, the diagnosis is sure if the family history indicates the disease has existed in the family or an area is found in other parts of the body, or the presence of afternoon rise in temperature, loss of weight, weagness (general), anaemia, cough, night sweats, diarrhoea or other general symptoms are manifest.

## CONCLUSIONS

1. Tubercular lesions in the oral cavity are very rare, while the pharynx and larynx are not uncommon locations.

2. The dentist should make an effort to discover the presence of such conditions and recommend his patients to the proper source for treatment, although they come to him for mechanical work only.

3. He should possess such knowledge on these subjects as to enable him to use the utmost care to prevent contagion, and to protect himself.

4. He should be able to use his mouth mirror in the pharynx and larynx of all suspicious cases and get a history of such cases, to be kept on record.

5. He should add his might to the host of enthusiastic workers in the endeavor to stamp out the ravages of disease.

6. He should improve every opportunity to give the patient and the public the best there is in him, and at the same time protect himself from any unnecessary exposure to or contact with diseases liable to shorten his years of usefulness.

3503 Franklin Ave., St. Louis.

# EDITORIAL

## Our Wish

The editor and publishers wish our readers an abundance of happiness during the coming year, and just enough sorrow to show them the difference.

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## The Recent Meeting of the Ohio State Dental Society

The 1912 meeting of the Ohio State Dental Society will go down in history as one of the best. The attendance was large and the lectures, papers, discussions and exhibits good. The President's address contained good suggestions, but it was a departure from the custom of the past several years of presidents giving a scientific presentation for the annual address. We hope that at the next meeting of the Society this custom will be resumed, for it is a distinct advance that could be followed with profit by all State dental societies.

Dr. G. V. I. Brown, Milwaukee, read a splendid paper on the subject, "The Effect of Nasal Restriction on Guinea Pigs, Rabbits and Dogs and the Relation of this Influence to Contracted Dental Arches, Maxillary and other Sinus Diseases, Trophic Changes, Mental, Nervous and other Disorders."

Dr. H. C. Brown, Columbus, presented a paper entitled, "Our Duties in Public Dental Education and Our Relation to the Public Press."

The election of officers, at the end of the afternoon session, resulted in the selection of Dr. W. A. Price, Cleveland, president; Dr. J. K. Douglas, Sandusky, first vice president; Dr. E. C. Mills, Columbus, second vice president; Dr. F. R. Chapman, Columbus, secretary; Dr. S. D. Ruggles, Portsmouth, treasurer. New directors: Drs. L. L. Barber, H. E. Germann, W. H. Whitslar, H. C. Brown.

The evening session, at the Grand Hotel, was one of the best of the meeting. Shafer ("Old Man Gump"), the clever cartoonist of the *Cincinnati Enquirer,* did some creditable cartooning of some of the officers and members of the society and "other subjects."

The lecture of the evening on "The Venereal Peril," by Mr. E. A. Deeds, president of the National Cash Register Company, was one of the best and most impressive presentations of the meeting. The talk was illustrated with stereopticon and moving pictures from actual living subjects.

This lecture is one of a number prepared, at great expense, by the National Cash Register Company of Dayton for enlightenment of their employes—a most commendable undertaking.

Wednesday morning there were clinics from nine to eleven. At eleven the Oral Hygiene Committee gave a practical exhibition of a school at work under the direction of the committee of the Cincinnati Dental Society. Every detail was given, from primary examination to operative work. At the afternoon session Dr. A. F. James of Chicago read an excellent paper on "Instrumentation in Pyorrhea Treatment."

Dr. C. F. Ash, New York, read a paper on "Removable Bridgework."

Dr. Herman Prinz, St. Louis, read a fine paper on "The Diagnosis of Diseases of the Dental Pulp."

Thursday morning was devoted to clinics and a final session of the society. The papers and discussions will appear in THE DENTAL SUMMARY just as soon as the proceedings can be gotten into shape for the printers.

Regarding the business side of the meeting, the most important things considered were as follows:

The society unanimously voted to become a constituent society of the National Dental Association with its entire membership, and made the necessary changes in the constitution and by-laws in order to harmonize with the new constitution and by-laws of the National, adopted at the Washington meeting and published in the November issue of THE DENTAL SUMMARY.

The dues in the state society were increased to $3.00, $1.00 of which will be for the National Dental Association dues. It is expected that within a few years the National will publish a dental journal, and the constitution and by-laws were so amended that when this National dental journal is published the National dues are to be increased to $2.00, which will include a membership certificate and the journal.

This question was previously submitted to the various component societies with a view of having them discuss the proposition and report their action. Most of the components acted upon this, and all that reported recommended that the state society become thus affiliated with the National. It would seem that the profession generally is going to give loyal support in making the National Dental Association a representative organization with a large membership, which will make it possible to wield greater influence in all matters.

On a basis of a membership of 900, the Ohio State Dental Society is entitled to six delegates and six alternates to meet with the first House of Delegates in Kansas City, Mo., July 10th, 1913, to select place of meeting, elect officers, appoint committees, etc. The following were elected in the order named:

*Delegates*—H. C. Brown, W. A. Price, J. R. Callahan, L. L. Barber, L. E. Custer, F. R. Chapman.

*Alternates*—C. W. Mills, J. K. Douglas, L. L. Zarbaugh, F. M. Casto, H. R. C. Wilson, S. D. Ruggles.

Other changes in the constitution and by-laws were that the Public Dental Education Committee succeed the Publicity Committee. The duties of this committee to be to disseminate information which will assist in giving the public a better knowledge of the importance of the mouth and teeth and to co-operate with a similar committee of the National Dental Association.

The society is to select, each year, one member at large for the Board of Directors for three years, and beginning with the 1915 session of the society each component reporting twenty-five paid members shall elect one of its members to the Board of Directors; a society having seventy-five paid members is entitled to two, and a society of one hundred and fifty, to three members of the Board.

In revising the constitution and by-laws to meet the increased dues, that portion of the constitution exempting payment of dues by life members was revoked.

The society endorsed the dentists' relief fund.

Dr. E. C. Mills was appointed chairman of the Committee on Organization of Component Societies, and an effort will be made to organize components in unorganized territory, which embraces about fifty-five counties.

Toledo was selected as the place of meeting in December, 1913.

## Parcels Post

After many years of agitation and cogitation, a parcels post law has been passed, approved by the President, and becomes operative January 1, 1913.

At the date of this writing preparations to take advantage of this new method of transportation seem to be quite general, and we believe that the provisions of the law will be given a fair trial. Whether the complicated system entailed shall prove workable and really advantageous to the country at large remains to be seen.

Taken at its face value, there seems every reason to believe that the operation of the new law will result in a very considerable saving to purchasers of dental goods.

On parcels weighing up to five ounces the rate remains the same; but a package weighing one pound will be carried a distance not exceeding fifty miles for the same charge, five cents; two pounds, eight cents; three pounds, eleven cents; a four-pound package, the same distance, fourteen cents; five pounds, seventeen cents. On a six-pound package the charge will be twenty cents; seven pounds, twenty-three cents, and so on up to the limit of eleven pounds, for which the charge will be thirty-five cents, the postal rates representing about one-half present express charges.

The most confusing part of the new law and that part which, if anything, will defeat its successful operation, is the zone system. Instead of the old "flat" or fixed rate, which takes weight and classification only into consideration, the rates by parcels post vary with the distance as well, bringing the postoffice department into direct competition with the express companies.

Six pounds, about the medium weight for a parcel, will be carried by the postoffice department fifty miles for twenty cents, 100 miles for twenty-six cents, 200 to 300 for thirty-two cents, 400 to 600 for thirty-eight cents, 1,000 miles for forty-four cents. For the same service the express companies would charge: 100 miles for thirty-five cents; 200 for forty-five cents; 300 or 400 miles for fifty cents, 500 miles for fifty-five cents, 600 for sixty, 700 or 800 or 900 for seventy, and 1,000 for eighty.

All kinds of rumors are rife concerning the probable action of the express companies with regard to meeting this competition, but nothing definite can be stated as yet. In the meantime all mail order buyers must expect delays and confusion, and are advised to instruct shippers to insure each valuable package against loss, such insurance being a feature of the new law.

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A TROUBLESOME CONDITION.—Oftentimes patients present with a marked soreness of the gum on the disto-buccal borders of an erupting lower third molar. There is usually accompanying this condition considerable throbbing and swelling of the surrounding tissues. These symptoms point to a septic pocket beside the crown of the molar, and covered by a tightly stretched band of gum tissue. The latter, being the chief causative factor, must be cut away, using a local injection of 1 per cent novocaine. The pocket may then be flushed out with a weak solution of "Camphenol," and after thorough cauterization of the neighboring gum tissue, with the electro-cautery, the pocket is filled with Beck's Bismuth Subnitrate paste. This treatment will result in complete relief.—ERNEST F. DECK, D.D.S., L.D.S., Eng., in *Commonwealth Dental Review.*

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MAKING GOLD FOIL ADHERE TO AN OLD FILLING IN REPAIRING.—The best procedure to make gold foil adhere to an old filling in repairing is as follows: The rubber dam is applied and the filling is carefully wiped with wet cotton, followed by sulphuric ether, in order to remove all traces of fat. The filling is then washed with alcohol and dried with hot air. No. 4 gold foil is well annealed, and, after the old filling has been roughened, the foil is brought into closest contact with the old filling by using the smallest serrated plugger under hand pressure. The new foil is then firmly condensed with the hand mallet.—*Archiv fuer Zahnheilkunde,* per *Dental Cosmos.*

**To be a strong hand in the dark to another in the time of need, to be a cup of strength to a human soul in a crisis of weakness, is to know the glory of life.** —Hugh Black.

# SOCIETY·ANNOUNCEMENTS

## New Jersey State Dental Society

Jersey City, N. J., Nov. 19, 1912.

*Editor Dental Summary:*

Dear Sir: At the forty-second annual meeting of the New Jersey State Dental Society, held at Cape May, N. J., July 17-19, 1912, the following officers were elected for the year 1912-1913: William I. Thompson, President, Asbury Park; William H. Gelston, Vice President, Camden; Charles F. Jones, Treasurer, Elizabeth; Edwin W. Harlan, Secretary, 47 Crescent Ave., Jersey City; Wallace F. Naylor, Somerville, Assistant Secretary. Executive committee: William H. Gelston, chairman; Walter F. Barry, Orange; Henry Fowler, Harrison; James I. Woolverton, Trenton; C. P. Tuttle, Camden. Membership Committee: Joseph Kussy, chairman, Newark; A. S. Burton, Secretary, Asbury Park; Franklin Rightmire, Paterson; J. F. Crandall, Atlantic City; Horace I. Beemer, Newton.

In addition to these, Vernon D. Rood, Morristown, N. J., was elected for a term of five years as a member of the State Board of Examiners to succeed B. F. Luckey, Paterson. Fraternally,

Edwin W. Harlan, *Secretary.*

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## Southern Michigan Association

The annual meeting of the Southwestern Michigan Dental Society was held in Kalamazoo, November 18-19. There was an exceptionally good attendance at the meeting, which proves that this society is rapidly coming to the front and will soon be one of the leading organizations of the State. Officers elected were: R. E. Patterson, Coldwater, president; S. J. Lewis, Kalamazoo, vice president, and R. A. Bowie, secretary and treasurer.

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## South Dakota Board of Dental Examiners

The South Dakota Board of Dental Examiners will hold its next meeting at Sioux Falls, S. D., January 14, 1913, at 1:30 p. m., continuing three days. All applications for examination, together with a fee of twenty-five dollars, must be in the hands of the secretary by January 10th.

For further information, blanks, etc., address

Aris L. Revell, *Sec'y.,*
Lead, So. Dak.

## Third Annual Meeting of the Minneapolis Dental Society
## January, 17, 18, 1913

We are pleased to announce that, up to date, we have completed arrangements with the following prominent dentists to be with us as clinicians: Dr. Burton E. Thorpe, St. Louis, Mo.; Dr. Frank Skinner, Chicago, Ill.; Dr. F. E. Roach, Chicago; Dr. Prothero, Chicago; Dr. J. W. Green. Chillicothe, Mo.; Dr. W. D. N. Moore, Chicago; Dr. J. V. Conzett, Dubuque, Iowa; Dr. J. P. Buckley, Chicago; Dr. Howard Raper, Indianapolis, Ind.; Dr. C. A. Griffith, Professor of Extraction, Dental Dept., U. of M.; Dr. J. A. Hiedbrink, Inventor of the Hiedbrink Nitrous Oxide Apparatus; Dr. Laid W. Nevius, extraction specialist, Minneapolis; Dr. H. B. Clarke, extraction specialist, St. Paul; Dr. Lars Frenz, Tammerfors, Finland; Dr. Jorgenson, Bergen, Norway; Dr. Forest H. Orton, St. Paul; Dr. U. E. Heddy, St. Paul; Dr. C. M. Work, Ottumwa, Iowa.

On Saturday evening there will be a banquet at the Commercial Club in the Raddison Hotel, after which Dr. Buckley will deliver his lecture on "Dental Therapeutics."

All of the clinics have not been arranged for, so this list does not constitute the complete program. In addition to these, we will have between forty and fifty of our most progressive practitioners in the Northwest, who will give interesting clinics showing the results of their study and experience. Space has been reserved by the manufacturers for one of the most elaborate exhibits of dental equipment and supplies ever shown in the Northwest.

Mark January 17th and 18th off your appointment book *now* and as soon as our program is printed a copy will be mailed to each dentist in the Northwest. For further information write

Dr. O. DeForest Davis, *Sec'y.*,
404 Donaldson Bldg., Minneapolis, Minn.

## Arizona Dental Society

The officers whose names appear below were elected at the fourth annual session of the Arizona Dental Society in Phoenix, October 29-30-31, 1912:

President, J. A. Messinger, Phoenix; Vice President, L. W. Downs, Douglas; Secretary-Treasurer, H. H. Wilson, Phoenix; Board of Directors: J. A. Messinger, H. H. Wilson, W. P. Sims, Bisbee; Eugene McGuire, Phoenix; R. J. Roper, Prescott. Board of Censors: L. B. Cary, Douglas; T. S. Lewis, Tucson; J. D. Holcombe, Globe. Committee on Public Dental Education: J. L. O'Connell, H. H. Wilson, Phoenix; L. C. Shaw, Tucson.

H. H. Wilson, *Sec.-Treas.*

## Chicago Dental Society

The annual clinic of the Chicago Dental Society will be held at Northwestern University Dental School, January 31st February 1st, at which time a testimonial banquet will be given Dr. Brophy.

C R. E. Koch, *Chairman,*
31 W. Lake St.

## Alumni Association, Marquette University

The Alumni Association, Marquette University, Dental Department will hold their annual meeting January 23 and 24.

We wish to thank the Minneapolis Dental Society for their hearty cooperation in changing their dates to conform to ours, the above dates being the only available time we could secure the proper place for meeting.

C. T. Rosenbloom, *Sec'y.*

## Indiana State Dental Association

The fifty-fifth annual session of the Indiana State Dental Association will be held in the Claypool Hotel, Indianapolis, May 20-21-22, 1913.

The officers of the association recently met at Indianapolis and perfected plans for a three days' "Post Graduate Course." The very best instructors and specialists are being secured for each day.

The course will be as follows: Tuesday, "Humanitarian Dentistry"; Wednesday, "Preventive Dentistry"; Thursday A. M., "Prosthodontia"; Thursday P. M., a great table clinic. The clinic will be held in the hotel.

No tuition fee for the members of the association or visitors from outside the State who are in good standing in their State Association, but all others desiring to take this course must arrange their tuition fee with the secretary.

Otto U. King, *Sec'y.*

Huntington, Ind.

## Ohio State Dental Board

At the last examination, held in October, the Ohio State Dental Board examined twenty-eight candidates for license to practice in Ohio. Of the twenty-eight only thirteen passed. Since the spring meeting the Board has revoked the license of one Ohio practitioner for immoral conduct.

## Resolutions Ohio State Dental Society

Whereas, The National Dental Association has adopted a new Constitution and By-laws, providing for State and Territorial Societies becoming constituent members thereof and reducing the annual dues to one dollar per member until such a time as a National dental journal shall be published, and

Whereas, A copy of this Constitution and By-laws, as well as a letter explaining the proposition, was sent to the officers of each of our component societies, with the request that this matter be considered by these societies in order to aid the State Society in determining final action, and

Whereas, Reports received indicate that component societies, representing more than two-thirds of our membership, unanimously recommend that our State Society become affiliated with our entire membership; therefore be it

*Resolved,* That the Ohio State Dental Society become a constituent member of the National Dental Association, with its entire membership, and that our dues be increased one dollar the coming year, and that the Secretary of this Society transmit to the General Secretary of the National Dental Association an amount equal to one dollar for each active member; and be it further

*Resolved,* That this Society elect, at this meeting, six delegates and alternates to meet with similar delegates from other State and Territorial Societies in Kansas City, July 10th, 1913, to form the first House of Delegates and select place of meeting, elect officers and appoint committees, etc. In accordance with a resolution passed by the National Dental Association, these delegates and alternates shall also serve for the 1914 meeting of the National.

# Correspondence

*Editor The Dental Summary,*
Columbus, Ohio.

Dear Sir: In The Dental Summary of December issue, 1912, appears a paper by Dr. Val H. Frederich, read before the St. Louis Society of Dental Science. In this paper the writer points out the advantages in warming nitrous oxide and in administering it under pressure for the purpose of anesthesia.

Dr. Frederich gives credit to J. T. Gwathmey, M.D., of New York, for having been first to demonstrate the above mentioned facts.

In justice to M. J. Emelin, D.D.S., of New York, I wish to state that he had demonstrated these important features before the Odontographic Society of Chicago, February 16, 1903—five years prior to Dr. Gwathmey.

Dr. Emelin's paper, "Certainty in $N_2O$ Gas Administration" (*Dental Brief*, August, 1904), gives a new and previously unobserved symptom, and, regarding the question at issue, says:

> "I maintain that to administer gas properly, it must be fully expanded by heating to about 60° F., it must be freely supplied, under slight pressure, for each inhalation; it must not be supplied when exhaling takes place.
>
> "Gas in expanded state is more economical, more effective, and, being of agreeable temperature, causes no irritation of the mucous membrane of the respiratory passages—such irritations as coughing, gagging, etc."

Respectfully yours,
Dr. L. E. Edel.

147 Fourth Ave., New York, N. Y.

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Born: To Dr. and Mrs. E. E. Haverstick, St. Louis, Mo., October 30, 1912, a son weight eight pounds. Congratulations.

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Died: At Port Huron, Mich., December 4, 1912, of pneumonia, Dr. M. B. Dennis. Complete obituary next month.

# THE DENTAL SUMMARY

The Magazine That Helps

Vol. XXXIII FEBRUARY, 1913 No. 2

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The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office; 1255 Neil Avenue, Columbus, Ohio
L. P. Bethel, M. D., D. D. S., Editor-in-Chief

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# REGULAR CONTRIBUTIONS

## THE EXTENT TO WHICH THE CASTING PROCESS MAY BE ADVANTAGEOUSLY APPLIED TO CROWN AND BRIDGEWORK.*

BY HART J. GOSLEE, B.S., D.D.S., CHICAGO.

The full extent to which the application of the casting process may have revolutionized the practice of dentistry is, of course, difficult to determine, but it is safe, I think, to say that its influence has been, and is now being, felt to a greater or less extent by even the most obscure dentists in the most remote districts.

Whether all who are now doing casting in some form or other will care to acknowledge it, or whether they will concede its revolutionary influence, and the marked advancement made possible by its application, or not, may be a question; but that at least a very large percentage of dentists are doing casting, and that they are doing better work, and doing it with infinitely greater comfort to their patients and with the expenditure of less nervous energy on their own part than they formerly did, there can be no question.

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*Read before the Lake Erie Dental Society, 1912.

That some are much more enthusiastic over its possibilities than others, and that some are getting much better results than others is also unquestionable, and it is as interesting as it is true.

However, this is but a natural sequence and should be expected in any field of effort in which former accepted practices and methods of long standing become so completely revolutionized and supplanted, if you please, in so short a period of time; where the pedestals upon which the cherished reputations of so many prominent practitioners were made to crumble and totter, almost in a day; where old and young must begin anew and alike, and where the application of this newer practice and its practicability must necessarily be tinctured with a saturated solution of personal equation.

From the beginning, however, it has been interesting to note that those who were early to grasp the possibilities of casting and, hence, who have been and are still doing the most of it, are the most enthusiastic over it, and, therefore, does it not naturally follow, by the same rule of thumbs, that those who were first to grasp and accept its wonderful possibilities, who have been and are still doing the most of it, and who are most enthusiastic over it, are also the ones who are obtaining the best results?

While it may be true that the proportion of those who ever attain to the very highest achievements in any mechanical pursuit is not a large one, still I am of the very firm belief that the casting process has afforded an opportunity for raising the standard, and increasing the percentage of uniformly good results; and, in the light of our present achievements, that this standard will become higher and higher in proportion as we recognize our own personal limitations, and realize the full scope of its possibilities.

Those, who by a process of self-analysis, may thus recognize their own limitations will not expect a mechanical process, or a machine of any make or kind, to adjust and adapt itself to the varying and intricate demands of an exacting line of work, unless the process is followed, or the machine operated, with an average degree of human intelligence, but those who fail to recognize this are surely destined to meet with failure.

Thus it is more than probable that many may have failed in attaining to the heights of even average success simply because they expected too much of the process involved, and exacted too little of themselves, but those in this class never become enthusiasts, and those who never become enthusiasts rarely become experts in any line.

Enthusiasm, expertness and all that goes with, to make for, and insure, success in the application of any mechanical process can, after all, come only from the "man behind the gun," and hence the operator who aspires to such must be willing to acknowledge this fact and contribute his share; and in this instance his share is in the form of ammunition, and the ammunition now needed most of all is correct and accurate technique.

While the factor of personal equation will necessarily demand a more or less different technique for each and every operator, yet the most scrupulous attention to details, and the utmost of accuracy is necessary in each instance, and as such a technique is to be acquired only at the expense of time, thought and energy, it is scarcely purchasable, nor may it result from delegating important parts of the work to laboratories, or to inexperienced or unskilled assistants, as is a common but bad practice.

When the average operator realizes these essentials to success, then the average operator may reasonably hope to rise above the average and achieve success in the application of the casting process, and as he appreciates them will he also find the field of usefulness broaden and the possibilities become more and more unlimited.

If there were no field to which the casting process may be applied other than the one which embraces the filling of teeth, however, let me ask you what a long-felt want would it still afford; what a broad field of usefulness would it occupy; what a priceless advancement would it mark in the preservation and restoration of the teeth, since it is now generally conceded that the inlay affords a better, quicker, less painful and probably, on the average, more permanent character of operation?

Granting all of this to be true, however, the limitations of this process have by no means yet been reached. Indeed, it seems that they are still only in their infancy, and that the field of usefulness as applied to all other phases of practical dentistry is as broad and far-reaching as is the degree and character of success already insured in the filling of teeth.

While this is undoubtedly true, to a greater or less extent, as applied to the whole field of dental prosthesis, it is particularly true as applied especially to the subject which it is my purpose to discuss at this time—that of crown and bridge work.

But a few—a very few—years ago this line of our work, which many of us are now pleased to designate and dignify as a "specialty," was but an indeterminable collection or mass of empirical details. Almost every dentist had his own ideas, and his own methods, and each differed from the other to such an extent as to confuse the teacher, and bewilder the beginner, in every respect and direction except one—the display of gold.

For many years patients wearing crown or bridge work, however limited or extensive in character, were involuntary advertising mediums for dental jewelers; were forced to display shocking evidences of a handicraft which, while in some instances useful, perhaps, were usually far short of art, and always more or less repulsive.

These evidences, I am sorry to say, may still be observed, but fortunately not to the same extent. As a profession, we are beginning to strive for higher ideals in the art side of our work, and in this respect we are aided materially by the demands of an ever-increasing degree of culture on the part of our patients.

Since porcelain has always been and is still the one substance which most closely simulates nature, and therefore best meets the requirements, this fact, together with these combined ambitions on the one part, and demands on the other, must lead one to conclude that more porcelain and less gold must be used in an effort to satisfy each.

While this was recognized many years ago, still the inherent element of structural weakness so characteristic of porcelain, and so often learned from sad experiences, together with the knowledge that cosmetics was but one requirement, and that in the construction of all forms of crowns and bridges the actual mechanical requirements of strength and accuracy of adaptation must necessarily receive first consideration, it is no great wonder that cosmetics was accordingly sacrificed.

If it were not, and if it is not, possible to obtain both of these requirements at one and the same time, then cosmetics should be placed second to, or sacrificed for the purely mechanical, but the possibilities of casting offer opportunity for obtaining all of the combined requirements to the very highest degree, and hence its application may be made to practically revolutionize all of our former methods.

This is possible because the casting process, skilfully utilized, insures, first, accuracy of adaptation, and, second, a maximum of strength with a minimum of gold; and in the proportion as the amount of gold necessary to insure strength may be decreased, the amount of porcelain may be increased. Thus, if our work be properly constructed, less gold and more porcelain may be safely and successfully used, and the suggestions which I have to offer you along these lines are based entirely upon the theme of more porcelain and less gold with equal and adequate strength.

Such manifestly desirable advantages are now to be obtained by means of a skilful application of the casting process, combined with a more general use of all-porcelain teeth instead of the ordinary thin facings.

You will probably agree with me that this type of tooth is preferable for single artificial crowns, because it affords better form, better color and greater strength than it is possible to obtain from the use of facings. Also that an all-porcelain tooth is better for bridge work because the presence of an occlusal surface of porcelain instead of gold, on any or all of the posterior teeth, is advantageous not only for cosmetic and hygienic reasons, but for actual masticatory purposes as well.

These advantages are so evident that the more esthetic operator has been forced to look and hope for some form of tooth, and some method of application which would eliminate the inherent weakness of thin facings, and the objectionable features incident to their use.

To overcome the shortcomings of the so-called "Richmond" crown, and of the ordinary bicuspid and molar dummy with porcelain facing and gold cusps, the advantages of some form of interchangeable or replaceable all-porcelain tooth, more closely simulating the form and color of the natural teeth, were early recognized. As a result of this recognition, many types have been introduced, but until very recently most of them have been of the thin facing variety, and applicable to the anterior teeth only.

While the all-porcelain tooth, such as the Davis, Logan and Justi crowns, has always been recognized as being the nearest approach to an ideal substitute for the natural teeth, yet they were not originally designed to meet the present requirements of crown and bridge work, and hence their use has been confined to that class of cases where more or less temporary results were all that was expected or demanded.

If the esthetic and hygienic advantages possessed by this type of tooth, however, could be combined with those of exact adaptation, and uniform and adequate strength, and if to these might be added the further advantages of being cemented to the structure instead of soldered, and of being replaceable and more or less interchangeable, it is evident that our efforts would be a nearer approach to the ideal.

In my opinion, which has been often expressed, the attachment of porcelain teeth or even facings to the metal structure by means of soldering, or of direct casting, is wrong. It is a wrong principle because the porcelain is subjected to a degree of heat which must endanger its structural integrity and influence the preservation of its color; because the tooth or facing is thus attached in a stiff and rigid manner, and, being friable, is more likely to fracture under the stress of mastication; and because, in the event of accident, no favorable opportunity for repair or replacement is usually afforded.

I think you will also agree with me, therefore, that the elimination of these objectionable features must necessarily constitute an improvement, and that such an improvement is to be obtained by the use of replaceable teeth attached to the supporting metal structure only by means of cementation.

An experience of many years has proven that this means of attachment is reliable in proportion as the adaptation of the metal to the porcelain may be close and accurate, or, in other words, in proportion as the porcelain may be "boxed up," protected and supported. It is stronger when so attached because it is not subjected to any degree of heat, and is not held so rigidly, due to the cushion-like effect afforded by cement; and because, not being held so rigidly, it is less likely to become fractured. Furthermore, the color is never changed; those dark blue marginal outlines due to the penetration of saliva between backing and facing are absent, and opportunity and facility for replacement in the event of accident always presents.

As I have previously stated, these possibilities and advantages are to be adequately obtained only in some form or type of tooth which presents as much porcelain as possible, which porcelain is not weakened by the presence of metal pins nor by the provisions for retention, and which, therefore, possesses a maximum of strength; which is of natural form, more or less universally applicable, and which will need but a minimum of grinding for effecting the desired and required adaptation.

This latter feature, as applied to the retentive surface, is essential, because in proportion as a given form of porcelain tooth will require but little or no grinding upon this surface in effecting its adaptation to the requirements of the individual case, may it be expected to be replaceable or interchangeable.

These combined advantages, I believe, are to be obtained in a form of tooth suggested by your essayist, and now known as the "Goslee Interchangeable Crown and Bridge Tooth," (Fig. 1) to which I am pleased to call your attention.

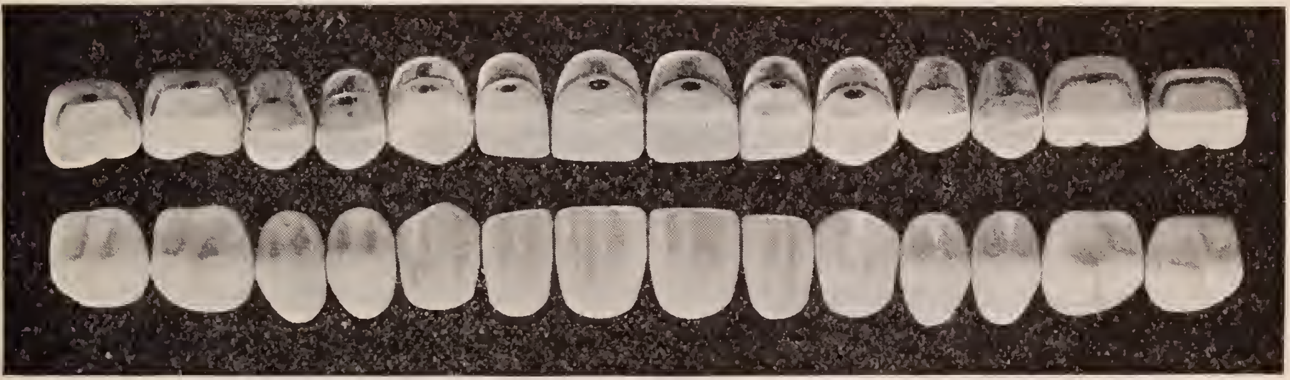


Figure 1

It will be observed that these teeth as now made are of natural form; that they possess the splendid strength and color characteristic of the Consolidated tooth bodies; that they are adapted to single crown work where any form of metal base is used, as well as to intermediate teeth, or "dummies" for bridge work; that they afford a minimum display of gold and require but a minimum amount of grinding, and that with a sufficiently large variety of molds they should be almost universally applicable; also, that they are strongest where the greatest strength is required; and that they offer ample opportunity for secure retention to the supporting base or structure.

A further advantage made possible by the use of replaceable or interchangeable teeth, which applies particularly to especially difficult cases, is to be obtained by making duplicates, and while it is true that any form of interchangeable tooth is far less likely to become broken from the stress of mastication, yet the making of duplicates coincidentally with the initial construction requires but little time, is always a source of inestimable protection to the particular patient, and affords unlimited relief and satisfaction to the dentist. It is, therefore, a safeguard which might be observed often and profitably by everyone whose necessarily small fees do not render it prohibitive.

In all instances, however, whether duplicates are made or not, the color number and mold number of each tooth used in every case should be recorded on the card or ledger sheet, and thus made a permanent part of the record. Because of these advantages and for these various reasons I firmly believe that only some form of interchangeable tooth should ever be used in single crowns, or "fixed" bridge work, of any type, if the best results and highest possibilities are to be attained in our efforts.

In addition to such desirable improvements as may be achieved by the use of teeth of this character, the introduction and application of the casting process has placed this field of our effort upon a more systematic and practical basis, as an evidence of which permit me to call your attention to the methods which I am now generally employing, almost to the complete exclusion of all other and former procedures.

### SINGLE CROWNS

For the ten or twelve anterior teeth, or all teeth within the range of vision, where porcelain is demanded, the all-porcelain replaceable or interchangeable crown, with *cast base*, and with or without a band, as the requirements may indicate, is used in a very large percentage of cases. It is undoubtedly the strongest, most artistic, and most universally applicable type of substitute for the natural tooth, and in all respects is second only to a skilfully adapted "jacket" crown. Indeed, for the average dentist it is better, more quickly and easily made, and, moreover, it possesses an advantage over the latter in that immediate replacement, in the event of a mishap, is possible.

### PORCELAIN CROWNS WITH CAST BASE

In the construction of this type of crown much difficulty has heretofore been encountered in molding the wax to a close adaptation to both the root-end, particularly at the periphery, and the base of the crown, and in holding the dowel or dowels in the proper position to insure correct alignment.

These essential features have usually been so uncertain, and in some instances so difficult and so unsatisfactory, as to cause me to work out and suggest a technique which eliminates such uncertainty, which insures accuracy, which is applicable alike to all cases, whether a band is required or not, which relieves the patient of any discomfiture whatever, and which has proven the most satisfactory method of crown construction I have ever followed.

In the various methods now generally used and advocated, good, accurate, reliable results are difficult to obtain, because the very plasticity of wax of any kind makes it possess a tendency to spread when subjected to the pressure necessary to mold it to a close adaptation. This tendency is best and most easily overcome by first adapting 38 gauge pure gold to the root-end, which may be done either by swaging or burnishing, and then adjusting the dowel, tacking it to the base with solder, and subsequently molding the wax to both base and tooth and casting directly to this disc of pure gold. If carefully done, the surface thus obtained will always be a closer fit to the root-end than can be obtained from the molding of wax alone with any investment material now procurable, and will require no finishing whatever after casting.

Such a procedure also reduces to a minimum the possibility of any change of form which may result from the warpage or shrinkage of the gold or alloy used in casting, but to obtain the best results necessarily involves the impression and die method, as illustrated in Fig. 2, and explained in detail in the Dental Cosmos, August, 1911.

The entire process requires but little time, is simple, insures a more or less perfectly adapted base, and one which is obtained without the slightest discomfiture to the patient, which is not possible when *burnishing* directly to the root-end is attempted. For single crowns a slight lingual lip or band is usually all that will be required. This strengthens the attachment between crown and root, and precludes the possibility of subsequent fracture of the root—for which purposes a band is usually used, but in all cases where the crown is to be used as a bridge abutment a full band should remain.

The construction of a crown by this method usually involves but three short sittings, and the best results are to be obtained by doing all the work directly in the mouth. At the first sitting the root is prepared, the root impression taken the mold number and color selected, and a temporary crown mounted. This latter feature is desirable as a means of packing the soft tissues away to afford and

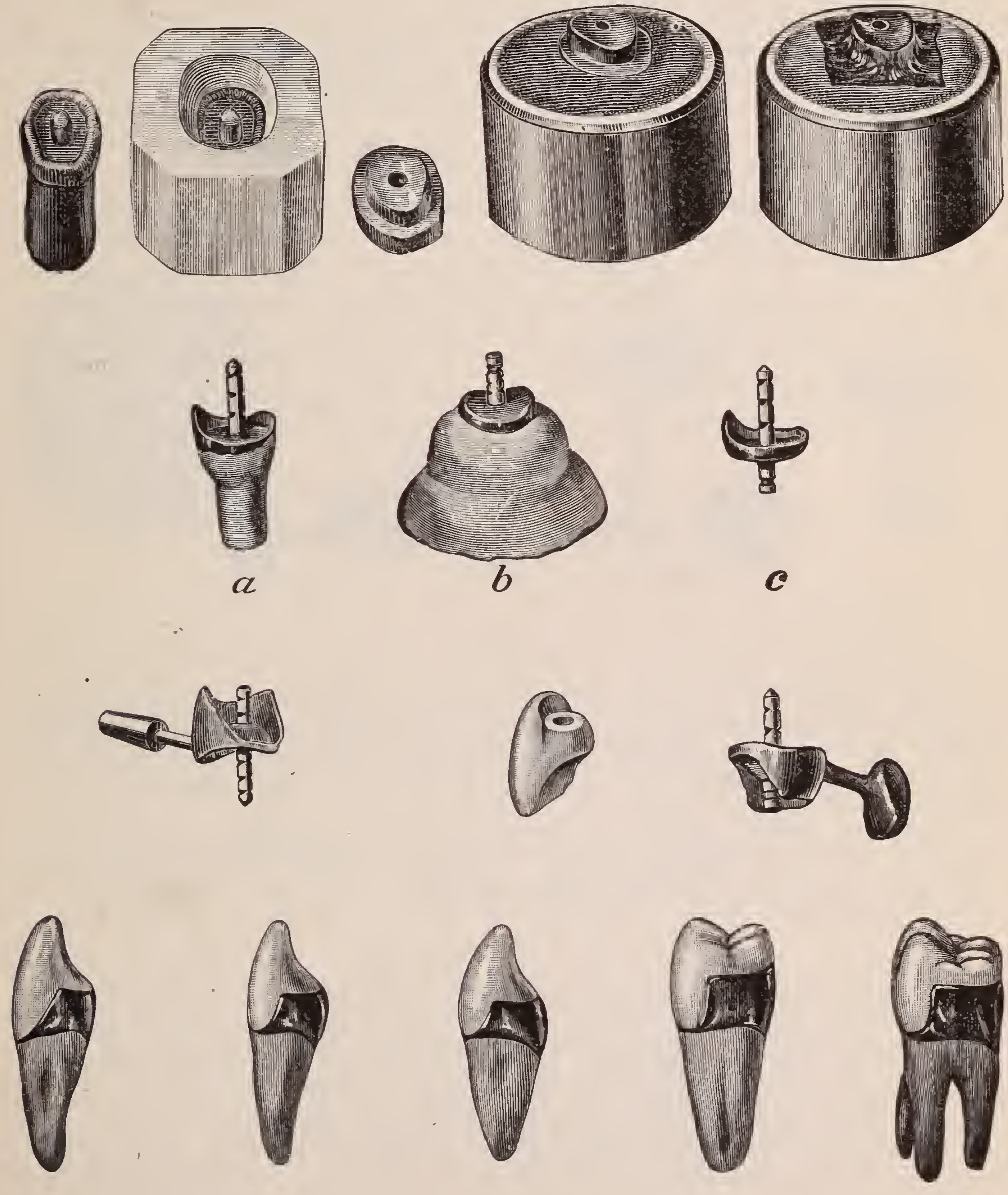


Figure 2

insure a free exposure of the root-end at the next sitting, as well as to relieve the patient of the temporary embarrassment. The amalgam die having been made and the pure gold disc swaged and tooth selected, in the meantime, at the second sitting the cap is fitted to the root, the dowel and tooth adjusted to the requirements, the dowel then soldered to the cap, and the relation between the tooth and cap secured with casting wax. The crown is then cast, the tooth cemented to place and finished, and the final mounting is made at the third sitting.

### GOLD CROWNS

For second and third molars—and even first molars, when the presence of gold is not objectionable—the cast gold crown affords results far in advance of anything heretofore obtained. In the construction of gold crowns by the casting process, however, the fit or peripheral adaptation is, because of the spreading tendency of the wax, *always best obtained* by previously fitting some form of band to the root and then casting directly to it.

Technique—Whenever it is desirable to exaggerate the contour, a narrow band of platinum or 22 karat gold, of about 30 or 32 gauge, should first be made to fit snugly around the entire periphery and then trimmed to evenly approximate the end of the root, after which all of the contouring may be done in wax, which can be best done, perhaps, on a model.

When an exaggerated contour is not required, however, and one seldom is, the band may be made of 28 gauge, 22 karat gold, and fitted and contoured in the usual manner. When in position on the root, casting wax is then molded to the end of the root inside of the band, and this procedure followed by an imprint in the wax of the opposing teeth in all the movements of mastication.

After the band has been removed, its interior should be filled at once with casting investment material and the occlusal surface properly carved, after which it may be invested and cast, using for the casting the same grade of gold of which the band was made (Fig. 3). If the band is thoroughty clean before investing, and the gold to be cast is of good quality and highly fused before casting, a good physical union will usually result, but if it does not, a small bit of 22 karat solder will insure the same.

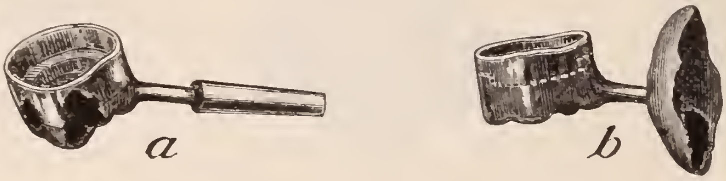


Figure 3

These two general types of crowns will meet the requirements of single crown work in a very large majority of cases, and the results by either method are far more accurate than by any of our former methods.

### FIXED BRIDGE WORK

In fixed bridge work, which constitutes an assemblage of attachments and intermediate dummies, our work may also be simplified, because three general types of attachments and three general types of dummies will be found to meet the requirements in an exceedingly large percentage of cases.

Attachments—The methods of obtaining attachment to the supporting teeth or roots embrace the porcelain replaceable crown with dowel and cast base, the construction of which has just been referred to, as applied to the roots of anterior teeth, or when it is impossible or inadvisable to preserve the natural crown; the inlay, when the attachment is to be made to the crown of a natural tooth, which is good practice when the remaining natural crown is sufficiently strong, and the gold crown for the molar teeth when the use of an inlay is for any reason not indicated.

As previously emphasized, wherever a dowel crown is to serve as an attachment for bridge work, a narrow band should always be used. In my opinion, this is absolutely essential, because of the additional strain to which the root is to be subjected, and as a means of insuring permanency and precluding fracture.

When an inlay is to serve as an attachment the cavity preparation is, of course, exceedingly important, and some form of post or posts should always be used to insure stability and as a provision against the inlay becoming loosened by the strain and possible torsion to which it is to be subjected.

The general applicability of the inlay as an attachment for bridge work has been a subject of considerable discussion ever since casting became an accepted practice. That it will serve the purpose as well as, in and some respects even better than, a full crown there can be no doubt, providing its adaptation and stability are insured.

The former depends first, upon adequate and proper cavity preparation, and then careful technique in making the inlay; and the latter depends upon the use of a proper alloy in casting, and upon pins or posts of some form, for the reasons mentioned.

Wherever the walls of the supporting tooth are sufficiently strong to insure permanency; whenever a suitable cavity may be properly prepared, the inlay, well-seated and securely anchored, and made of a hard alloy, such as five per cent. platinum in pure gold, coin gold, or 22-karat gold, I am of the impression that such an attachment is often better than a full crown because of the absence of any possibility of gingival irritation, such as is so often present where the latter is used.

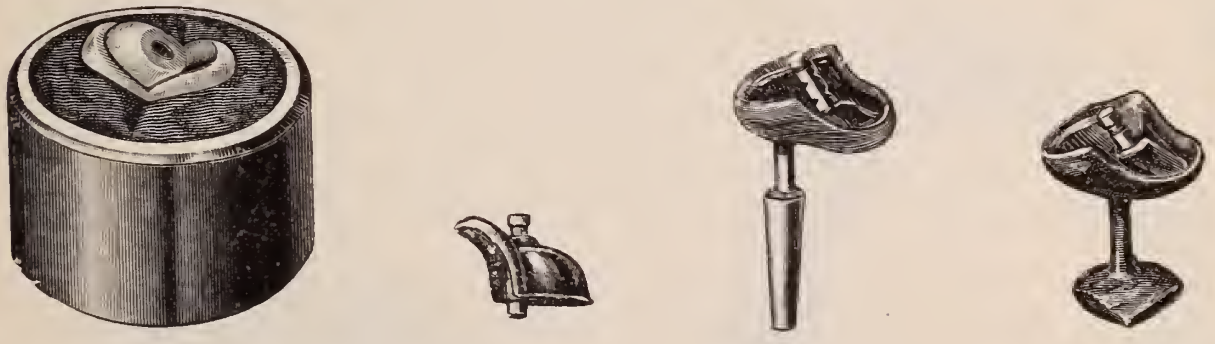


Figure 4

The cavity preparation for such inlays does not differ essentially from that for a simple filling, excepting that its buccal, lingual and cervical margins must be so extended as to carry the margin between tooth and filling beyond any actual contact of the artificial tooth to be supported by it, in order that each and all of these margins may be exposed, for hygienic reasons. (See Fig. 6)

"Dummies"—As dummies for fixed bridge work, three general types will answer the requirements in all cases.

The all-porcelain replaceable crown and bridge tooth with cast backing is adapted to all positions in the arch where the conditions of absorption and occlusion will permit their use, and is undoubtedly the ideal form of artificial substitute. Backings for these teeth should usually be cast separately, though they may be made in sections involving the number of dummies between the attachments, which should never exceed three, or possibly four. Better form, cleaned interproximal spaces, and less display of gold, however, are obtained by making each backing separately.

As a means of preserving the proper relation of the short sustaining post which holds the tooth to the backing, and of insuring a smoother surface adaptation of the backing to the porcelain than the ordinary casting investment materials afford, in using this type of "dummy" a thin backing of about 38 gauge, pure gold should be previously swaged to the tooth, as indicated in Fig. 4, and the post soldered to it. It is then always necessary to allow as much surplus end of post as possible to extend beyond, in order to insure strength in the final attachment of this essential part to the completed backing.

Casting wax may then be molded to the required form, and the casting made directly upon and against the thin gold backing, by which method any distortion or possible misfit due to shrinkage or warpage is overcome, and the most finished, accurate, and reliable results are insured.

In the use of this type of tooth in all cases in the upper arch where complete absorption has already taken place, the most sanitary form of structure is usually to be obtained by molding the wax so as to restore or approximately follow the lingual form of the tooth, but tapering down to a narrow saddle at the point of contact with the soft tissue. As a rule, and contrary to the opinions of some, however, wherever the adaptation is good, such a type of construction will be found to be far more sanitary than the usual recesses, shelves, and pockets, so common in the ordinary methods.

In the formation of this type of saddle, the desired results may be best obtained by first burnishing the same thickness of pure gold to the model, between the finished abutments in position thereon, and then trimming it to conform to the size of the necks of the teeth to be supported by it. The general form of the structure may then be made by filling in between this saddle and the backings with wax, after which the piece may be invested and cast. Or in instances where this space is exceedingly small it may be filled with solder.

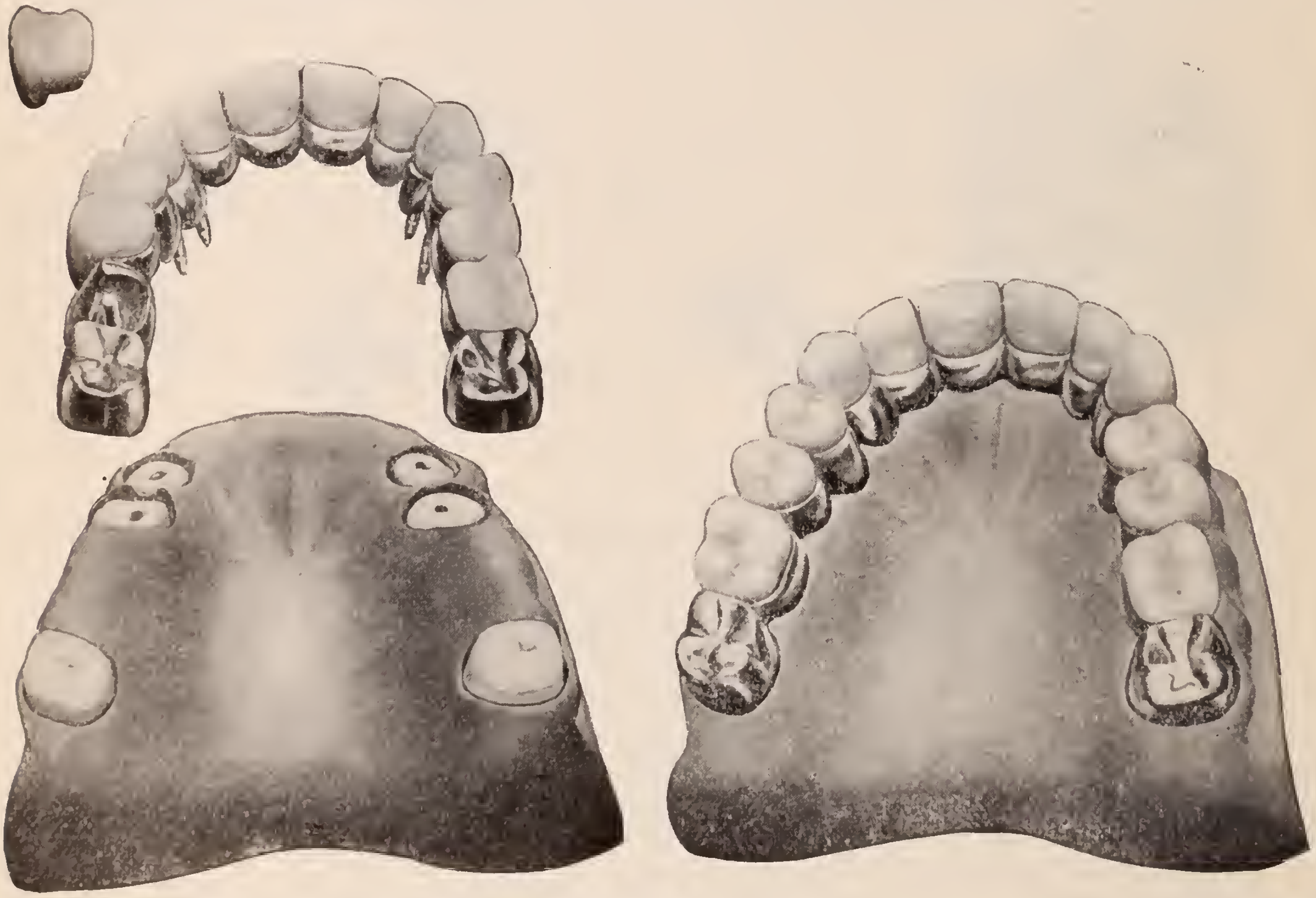


Figure 5

In this more or less typical fixture (Fig. 5), it will be observed that practically no gold is displayed anterior to the second molar, and yet that a maximum of strength presents throughout.

In cases where complete absorption has not occurred, a saddle is, of course, contraindicated, but in these cases the neck of the porcelain tooth should accurately fit and should bear firmly upon the soft tissue, and the lingual surface of the backing should then be so formed as to be as nearly convex or self-cleansing as possible.

For those cases in the anterior region where abnormalities of occlusion or elongation of the opposing natural teeth demand a thin facing, the ordinary type of long pin facing may be used. In its use, however, the best results are to be obtained by previously backing it up with thin pure gold, adding wax to this to the desired form, removing the facing and casting. The pins may then be threaded and, when the backings have been assembled with solder, the facings may be cemented to position, thus obtaining all of the previously mentioned advantages of cementation, combined with better form and more uniform strength.

In addition to these, for those cases particularly in the lower arch, and in exceedingly "close-bites," where cosmetics is not a factor, or where the extent of absorption or the elongation of opposing teeth precludes the use of porcelain in any form, the all-gold, cast dummy may be used. Such dummies may be made to conform to the requirements of occlusion, adaptation to gum—if such is required—and contact with the attachments, in wax, and then invested and cast in one piece. This type of "dummy" is useful in supplying the lower second bicuspids and first and second molars and may include only the occlusal surface, thus forming the so-called "self-cleansing" type of bridge, or the entire tooth with or without a saddle, as the requirements may be. The former type of construction is indicated only where there is an excessive degree of absorption, which will permit of sufficient space between the gum and occlusal surface to insure self-cleansing properties, and wherever this space is not great enough to be *easily kept clean,* direct contact with the gum will afford a more hygienic result. In other words, there should be plenty of space, or none at all. A typical case of this kind showing the use of all-porcelain dummies in connection with inlays is illustrated in another model.

With these, the problem of attachments and of intermediate dummies for almost universal application is simplified and systematized.

The remaining feature incident to the construction of all forms of fixed bridge work involves only the proper assemblage of the various parts. While some are casting all attachments and backings with an alloy of five per cent. of platinum in pure gold, and subsequently assembling them with pure gold, thus using no solder whatever, still a good grade of 22-karat gold or coin gold may be used with equally good results. When either of the latter is used, the final assemblage may be effected with 22-karat solder, and providing there is absolute contact between all of the parts to be united, the procedure is thus somewhat facilitated, and the results are uniformly good.

### REMOVABLE BRIDGE WORK

The same general ideas are also applicable to the construction of removable fixtures.

For this class of work, also, three general types of anchorage to the supporting teeth or roots will be found to adequately meet the requirements of the average case. These embrace clasps, the telescoping tube and split post, and the various forms of manufactured attachments.

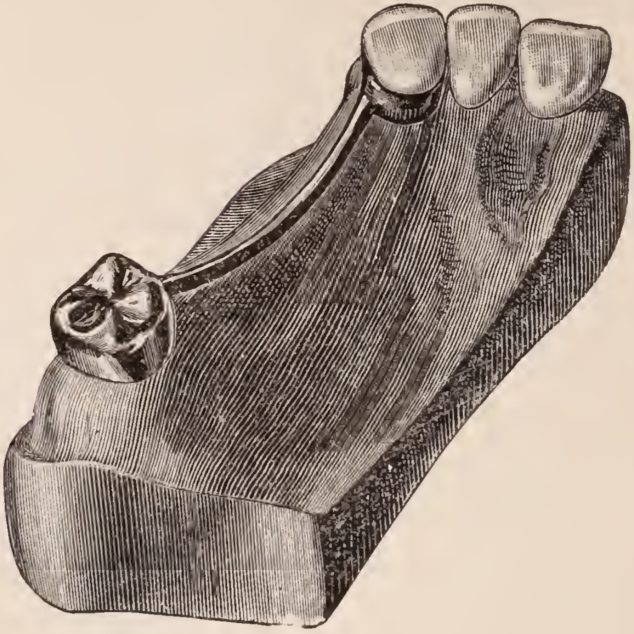
Wide clasps encompassing three angles of the tooth, provided with an occlusal rest, not cast, but made of heavy rolled clasp-metal alloy, probably afford the very best means of obtaining anchorage to the natural or artificial crowns of bicuspids and molars.

That clasps should not be cast is especially emphasized, because the molecular rearrangement resulting from casting most of our present alloys destroys to a greater or less extent the very qualities of strength and resilience demanded of them, and which undoubtedly obtain best in a rolled or drawn metal or alloy.

In all forms of removable bridge work or partial dentures, where clasps are used, however, some form of occlusal rest is necessary as a means of providing against subsequent settlement of the case. If this precaution is not observed, complete loss of occlusion and usefulness will soon follow.

The telescoping tube and split-post attachment is also useful when confined to the roots of the six anterior teeth.

The Roach, Morgan and other types of manufactured attachments will also be found valuable when used in connection with either porcelain or gold crowns or inlays on the cuspids and bicuspids.



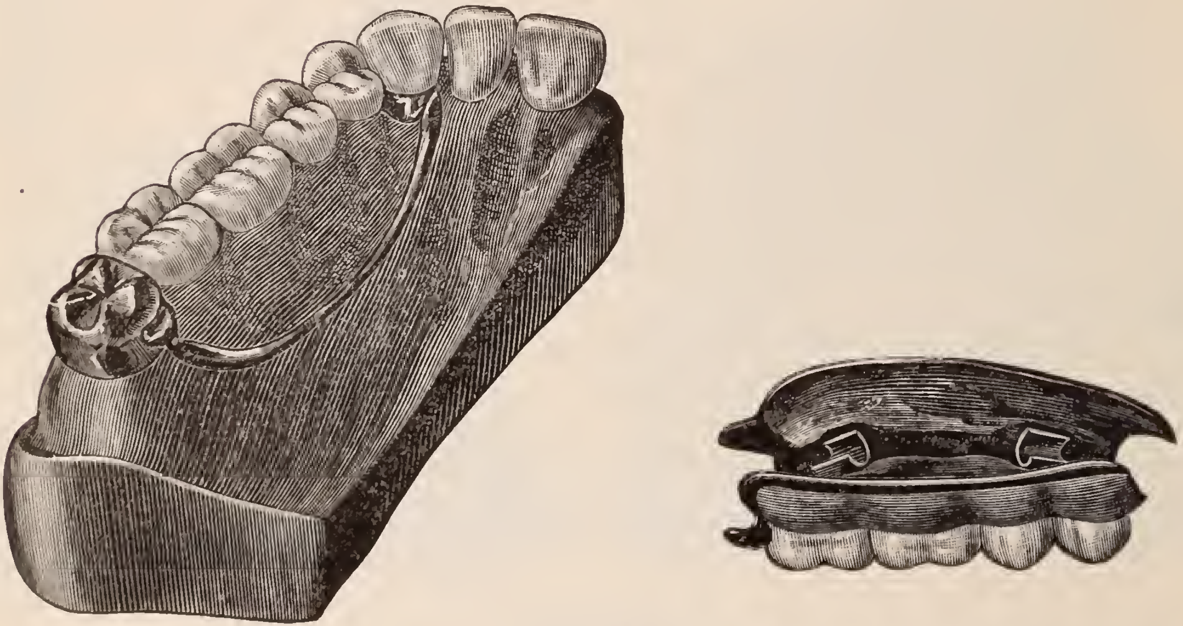


Figure 6–A

In addition to these, I am pleased to offer you an entirely new method of attachment, which, while perhaps but a modification of some of the previously mentioned types, is entirely original, and more or less universally applicable.

This attachment consists in utilizing the grasping principle of an open tube with straight and parallel sides, which is the removable part of the fixture, in combination with a round wire, of about 12 gauge, attached to and therefore a part of the "fixed" portion of the structure, but lying in a horizontal position instead of in a vertical one, in its relation to the supporting fixture.

Such an attachment may be made by utilizing the tube of a "Roach" attachment in combination with 12 gauge clasp-metal wire, and while simple and easily constructed is especially useful in extensive cases, where the abutment pieces are assembled (Fig. 6), though equally applicable to less extensive, or to the most simple cases.

It is easily applied, easily tightened when loosened by wear, takes up but little space, does not require absolute parallelism when more than one is used on the same fixture, is applicable alike to either gold or vulcanite work, and is secure.

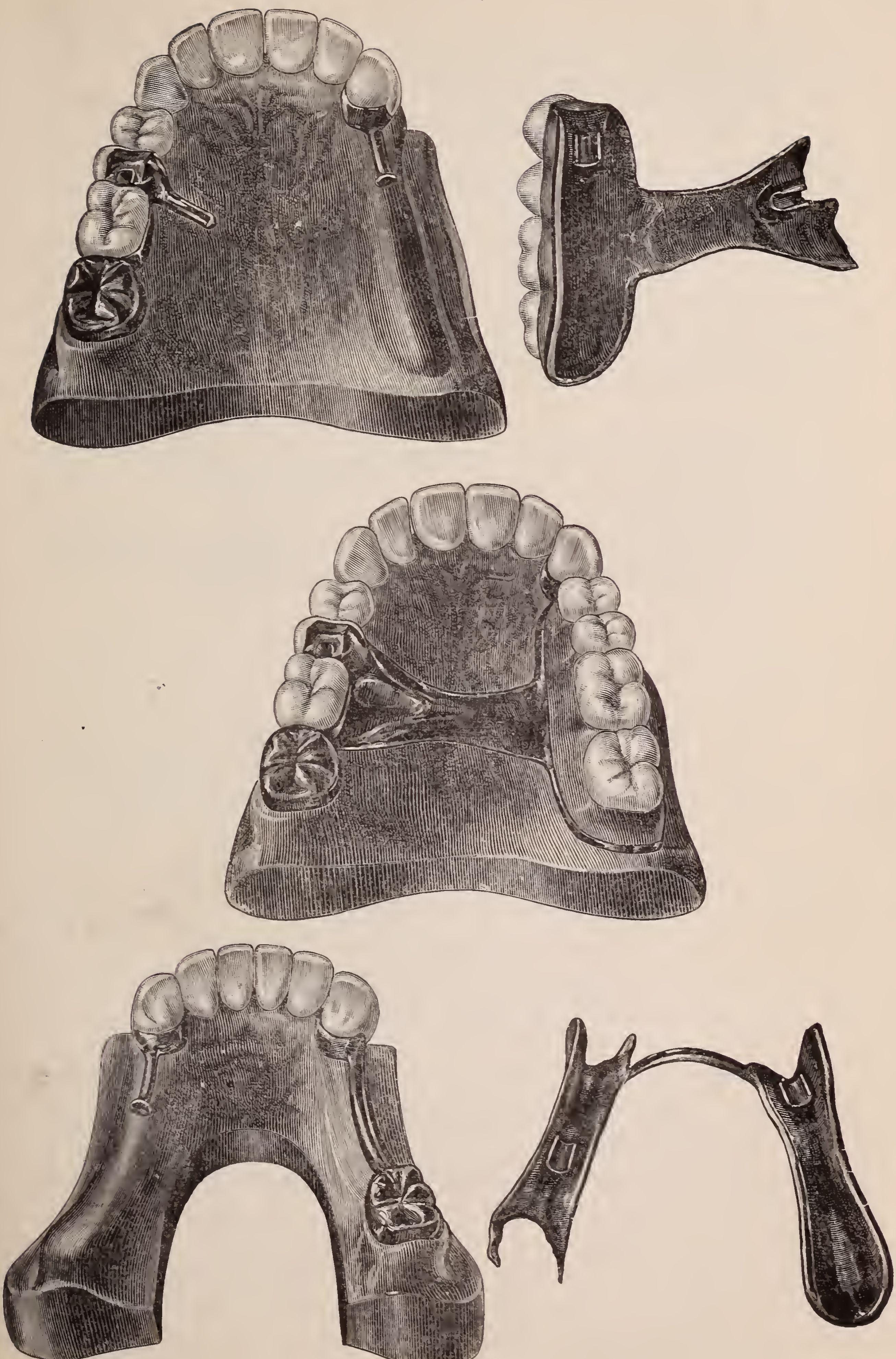


Figure 6–B

Its recent use in many cases has afforded me greater satisfaction than all of the other methods of attachment for removable fixtures combined.

I am recently informed that a similar type of attachment, known as Gilmore's, is now on the market, and may be easily procured, which will be an advantage to those who do not care to make it.

When the type or types of attachment thought to be best indicated have been selected, adapted, and completed, the casting process then offers splendid opportunity and great possibilities for the subsequent formation of the body of the fixture, and in this connection I believe that the successful casting of large pieces is only a question of the development of proper technique.

In the construction of cast bases, if a good model of a high grade investment material is obtained, and if the wax base is carefully formed, made sufficiently thin and properly stiffened, the process offers the same assurance of accuracy of adaptation and of strength as previously indicated, and the possibilities are equally unlimited. For all forms and sizes of saddles, or bases, coin gold seems to be especially adapted to cast work, and to afford all of the integral strength ordinarily demanded.

In the presentation of much of this technique, quotations from former papers have been necessary, to a greater or less extent, but the fact that repetition is made to serve in preference to changes and alterations only proves that I am still courageous in my previous convictions.

As a final suggestion, permit me to again impress upon you the advantages of simplifying and systematizing your methods, and of casting; the necessity for careful technique and the unlimited possibilities resulting therefrom.

# TEMPORARY CROWN.*

BY HARRY C. CARR, INDIANAPOLIS, IND.

This crown is to be used in emergency cases, and is made as follows: Select a facing, or rather a vulcanite tooth, of proper size and color to correspond to adjoining teeth. Grind it to proper length, allowing the cervical end of vulcanite tooth to rest on end of root. Procure a piece of German silver or ankrite wire 14 or 16 gauge and cut it long enough so that one end will reach down and go between the pins of facing and still project out over the cervical end of facing, to go up into the root sufficiently far to hold crown in place firmly. After dowel has been cut to proper length, place it between pins of facing and pinch pins against it. Unite dowel to facing by investing in some quick-setting material and flow a small piece of some kind of hard solder. It may be done also by wrapping facing and supporting dowel with fibre asbestos and flowing a piece of soft solder, using the blow-pipe with a little cement liquid as a flux. Mount crown by forming a base for it out of a little gutta-percha or temporary stopping, placing it on root while gutta-percha is warm and trimming to suit case. It is, of course, set with temporary stopping or gutta-percha. This can all be done in less time than it takes to tell it. By its use it is never necessary to send a patient out of the office with a front tooth missing. The dentist can take plenty of time in getting the permanent piece ready, and the gum is kept free from the end of the root.

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*Clinic at Kentucky State Dental Society, 1912.

# THE IMPRESSION METHOD FOR INLAY WORK*

BY HENRY W. GILLETT, D.M.D., NEW YORK CITY

Since the introduction to dentists of gold casting by Dr. Taggart, a large part of the dental profession has been concentrating its energies on the technique of the casting process. As a result many variations have been evolved and published. Prior to Dr. Taggart's introduction of the cast gold inlay, and antidating it by a period sufficient for many of us to have adopted it for constant use in filling cavities of medium and large size, we had the so-called matrix, or two-piece inlay.

When the cast inlay became possible, many operators who had been using the matrix inlay found it easier to adapt to the new process the technique they were already familiar with, than to develop the technique devised and so successfully carried out by Dr. Taggart.

This so-called indirect, or impression method, has been repeatedly shown at clinics, but I think it has not been as carefully described in our literature as it deserves to be. Because of this belief, I was easily persuaded by your committee to endeavor to present the merits of the process pursued by many successful practitioners, especially as it gives me an opportunity to urge upon you the need for, and the practicability of further advance in the perfection of this branch of our work.

In order that we may understand each other, I desire to say at this point that in speaking of gold inlays, or gold restorations, I have constantly in mind inlays or restorations that fit the cavity margin accurately at all points, and that reproduce, as far as possible, the anatomical features of the parts they replace. In my estimation inlays are failures if they show a cement line, lack approximal contact, or present smooth occlusal surfaces.

The type of inlay I shall have most in mind is the ordinary occluso-approximal of at least medium size, and from this up to complex restorations of whole crowns.

In order to direct your attention at once to the points I desire to emphasize, I will first enumerate some of the advantages which I believe accrue to the user of the indirect inlay method, and will then, at the risk of being tiresome, endeavor to describe in detail the steps of that method.

In conclusion I shall call to your attention the need for further advance in our technique with regard to reproduction of occlusal surfaces.

Among the advantages which I personally find in the indirect method are the following:

First—Superiority of fit and ability to use an alloyed, and consequently harder gold without interfering with this superior fit. My usual choice for inlays is an alloy of 97½% pure gold and 2½% pure platinum. In cases where greater hardness is desired, a higher percentage of platinum may be advantageously used, but the 2½% alloy presents the advantage of sufficient ductility to permit of the manipulation necessary to correct the errors accompanying the casting process.

Second—The fact that we have in this process a hard die or cast of the cavity on which this necessary correction can be done.

Third—The comfortable feeling that comes from the knowledge that if anything goes wrong in the casting process itself where it is less easy to guard against error, it is simple to start afresh without recalling the patient since the same die and occlusion are at hand, and will serve to make a dozen reproductions, if necessary.

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*Read before the Lake Erie Dental Society, 1912.

Fourth—Opportunity for more perfect carving of anatomical characteristics in complex cases, and opportunity for finishing on the die, relieving the patient of all finishing in the mouth, except the final burnishing of the margins, and the slight polishing needed to remove the burnisher marks, thus conserving the time of the patient.

Fifth—The removal to the laboratory bench of all the carving and finishing at the hands of an assistant, and the consequent saving of the operator's time, and the enlargement of his capacity to turn off work.

It has been for some years my expressed belief that the same care and attention to detail by either the direct or indirect process would produce similar results. I have more recently come to feel that for all work except the conspicuously simple cases, the indirect process will average to turn out better results; that, contrary to the frequently expressed opinion the finished product is actually separated from the cavity by fewer steps conducive to error than when the direct process is followed.

It is generally held by advocates of the direct process that the indirect process introduces two extra chances of error in the taking of the impression and the making of the die.

Frequently we hear the claim made that the wax model exactly fits the cavity, and that the gold casting reproduces it with absolute exactness. Neither of these statements is generally true under the conditions necessary in our work.

The wax model necessarily changes in volume on being transferred from the temperature of the mouth to that of the operating room and again on being invested, the investment expands in the drying, wax burning and casting steps in a ratio usually unknown to the workman; worse still it often appears to warp in directions to which the workman has no clue except as supplied by the ill fit of the casting.

It is my belief that the errors in the taking of cavity impressions and those in making the die or duplicate of the cavity are more easily within the control of the operator than are those liable to occur at nearly every other step of the casting process—consequently I hold that when those two steps have been well performed the operator can, by the aid of the resulting die, correct most of the errors occurring in the subsequent steps and that his product will suffer less from errors influencing its fit. In short, I contend that until such devices as Taggart's Wax Warmer and Van Horn's device for maintaining body temperature during investment are obtainable, until investments are better understood, and the errors in their manipulation better guarded against, greater accuracy of fit will be possible by the indirect process than by the direct process, assuming similar conditions with regard to care and skill in both instances.

The description of the steps which I am about to give you will show you that there is greater chance of controlling error due to shrinkage of the impression material when taking the cavity impression than there is of controlling that of the wax model when made in the cavity because it can be better kept under pressure and some of its shrinkage compensated for in the earlier stages of its cooling by forcing it further into the cavity. I think it will be conceded without much argument that we have amalgams from which dies may be made, which reproduce with but very slight error the form indicated by the impression.

I will now attempt to describe in detail the steps of the process.

Cavity Preparation—The only special point to note as different from any inlay cavity preparation is that in bell-shaped teeth it facilitates the work to cut back the approximal contour making a flat approximal wall. This is not feasible in many mesial cavities, but in distal cavities and others so placed that it will not result in undue exposure of gold, it permits the bringing of the approximal margins of inlays to the area of immunity with less sacrifice of tooth tissue and with less discomfort for the patient than if the whole cavity is broadened to the line of safety.

The impression of a cavity so prepared is less likely to be injured in withdrawal.

The Bite—The cavity being prepared, the next step in my own routine is to get a wax bite with sufficient accuracy to permit placing the die in it in its correct relations to the opposing and adjoining teeth.

If the die is inaccurately placed then the finished work will be wrong in contour, or occlusion, or both. Sometimes I take also a small impression of opposing teeth from which a cast is made for setting into the wax bite, and this is frequently the more accurate procedure, as it usually provides a more perfect reproduction of the opposing teeth than does the imprint in the wax.

In taking the wax bite, it is preferable to select a fairly hard wax so it will be rigid when cold, and thus stand handling when placing the die without resulting distortion. When taking the bite place the vaselined fingers of one hand each side of the teeth containing the cavities so as to prevent lateral spreading of the wax, and with the fingers of the other hand mold the wax first well into the cavities and then flatten it till the depth of wax into which the opposing teeth are to bite is reduced to the minimum required for the imprint of the desired portion of those teeth. If there is a large surplus of wax it tends to flow out laterally when the patient closes the teeth and thus distorts the impression of all the teeth included. Some patients can materially assist by maintaining closure and molding the wax against the teeth with the tongue while the operator does the same on the buccal surface with the fingers. Sometimes it is well to chill the wax before removal, but usually the surplus is sufficient to permit of its immediate removal without distortion.

Taking the Impression—Several materials are in use. The writer prefers "Perfection Impression Material" because it softens at a low temperature, and quickly becomes rigid on chilling. There are numerous variations of technique for getting the impression, but underlying all the desirable ones are two general prinicples. The first is that the impression material should always be so confined as to cause it to be pressed directly against all parts of the cavity, particularly all margins. The second is that the deeper part of the body of the material to be used should be firmer than the surface so that it shall serve as a support to hold the softer parts up to their required office, and as the whole mass is being cooled under pressure, to force the softer parts closer, if they tend to contract away from the surfaces of which an accurate imprint is desired.

This is accomplished in various ways. For short root ends, or for complex restorations where a whole occlusal surface, or more than three surfaces of a tooth are included in the restoration, it is frequently desirable to fit a seamless band of soft copper, or other metal, proceeding as if to fit a crown band except to have it a little looser. When this is complete a block of impression material is formed to a cone shape, having its tip just soft enough so as to avoid stickiness, and is then pressed well home with the fingers, and kept under pressure while being cooled by a stream of cold water, or better, a stream of compressed air at 20 to 30 or more pounds' pressure. The latter plan is preferable to most patients because less irritating to other teeth, and it is neater.

With the opposite extreme in cavities—the simple four-walled cavity, just a stick of compound and an instrument to keep the gum away if it be needed, serves better than any cup, as the solid base of the block of impression material takes the place of the cup, and confines the softer portion.

For ordinary occluso-approximal cavities, cups made of German silver, platinoid or the Roach Impression Cups are preferred by many, and serve admirably. In using these cups it is important that after placing the material in the cup the whole mass be cooled and the surface again softened so as to provide for the hard base of material already referred to as essential to success.

I have left to the last the technique which I use most frequently, and which I consider best adapted to making sure of a well defined imprint of all parts of the cavity margin of occluso-approximal cavities extending to, or beyond the gum line. Selecting a piece of platinoid of 32 or 34 gauge a little narrower than the length of the crown of the tooth in hand, and long enough to permit of its being curved around so as to cover its lateral sides 1-3 or 1-2 way, I proceed to form a matrix by trimming the cervical side so as to impinge as little as possible on the gum, and usually cut the middle of its occlusal side in a curve with its depression in the center. This latter facilitates forcing the impression material well home as it does not have to enter so deep a pocket, and the curving around the sides of the tooth helps to confine the material and hold it to its work at the approximal margins. (Fig. 1).

This matrix is generally held in place with wedges of absorbent cotton tucked in between it and the adjoining tooth. If the shape of the tooth containing the cavity is such that any bit of impression material overlapping beyond the cavity margin is likely to be broken in the removal of the impression, then the matrix is wedged snugly against the cavity margin so as to avoid having such a surplus. In this case the cavity margin in the die is formed by the angle of junction of the cavity wall and the matrix. If, on the other hand, the tooth shape is such as to facilitate removal of impression and surplus intact, the matrix is wedged less firmly into place so as to allow the impression material to extend over the cavity margin and insure an imprint of the surface of the tooth adjacent to the cavity as well as that of the margin itself.

The matrix being satisfactorily placed, a piece of impression material of appropriate size and shape is selected, and one end of it warmed and formed into a cone shape. The cone may advantageously have been formed in advance by assistants, thus conserving the operator's time. When softening and shaping the material, it is helpful to keep the fingers lightly coated with vaseline. Having the cone of compound softened with regard to its tip, and firm in its deeper parts, warm the outer surface of its base enough so the corners will not interfere with exerting firm pressure with the thumbs or fingers. Oftentimes I then stick the base while thus superficially softened onto whichever thumb or finger is the appropriate one for the case, and so carry it to position, pressing it firmly to place and guiding or supporting it with other fingers as may be necessary. Sometimes this forming of the surplus with the fingers is necessary in order to insure removal of the matrix with the impression. I keep pressure on the mass, and direct a stream of compressed air against the material, thus quickly chilling it. If the cotton wedges are accessible I usually remove them before unseating the impression. This is not essential, but sometimes facilitates removal of the impression without liability to fracture of important parts.

After the removal I immediately dry the impression with a stream of cold air, and examine it carefully with a magnifying glass to make sure that the imprint of the whole cavity and especially of the cavity margin is clear and accurate. (Fig. 2).

The patient is then dismissed, and the tray containing the impression, bite and card bearing the necessary instructions is sent to the laboratory. If there are no unusual conditions, I give the case no further thought until the patient arrives for the next appointment, at which time the inlay is tried in, its approximal and occlusal relations tested and perfected, if necessary, and it is cemented in place.

In the laboratory the first step on receiving the tray is to inspect the relations of the matrix to the cavity margin. If it has sprung away at all it is pressed accurately to place, a very little stick wax applied to its exposed side, and a bit of match stuck to it, the other end of the match being firmly imbedded in wax. This provides a brace that holds the matrix in place, and avoids risk of distorting the impression, which would invariably follow if enough hot wax to hold the matrix were to be applied directly to it while under pressure sufficient to retain it in

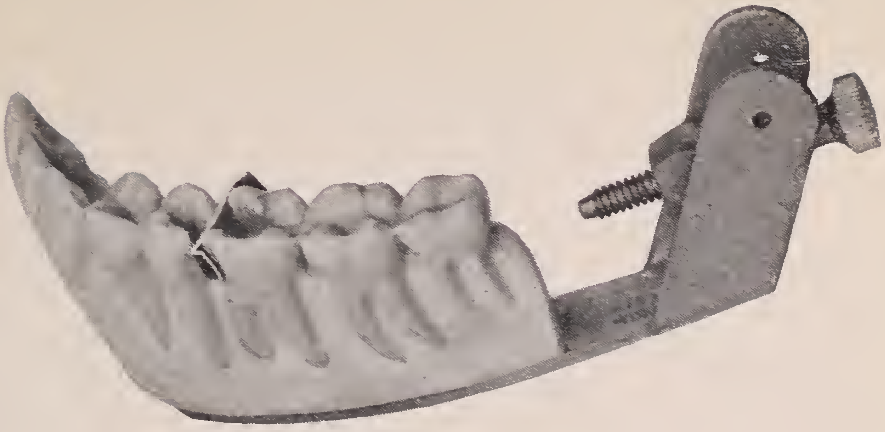

Fig. 1

Fig. 1—Typodont with prepared cavities and matrix in position ready for impression of one cavity.

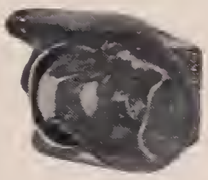

Fig 2

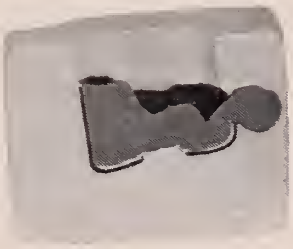

Fig. 3

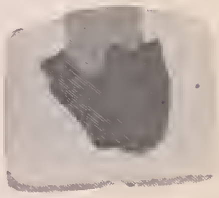

Fig. 4

Fig. 2—Impression of cavity with matrix in place.

Fig. 3—Section of impression and plaster investment as it would stand when ready for packing die.

Fig. 4—Section of a packed die before removing impression and investment.

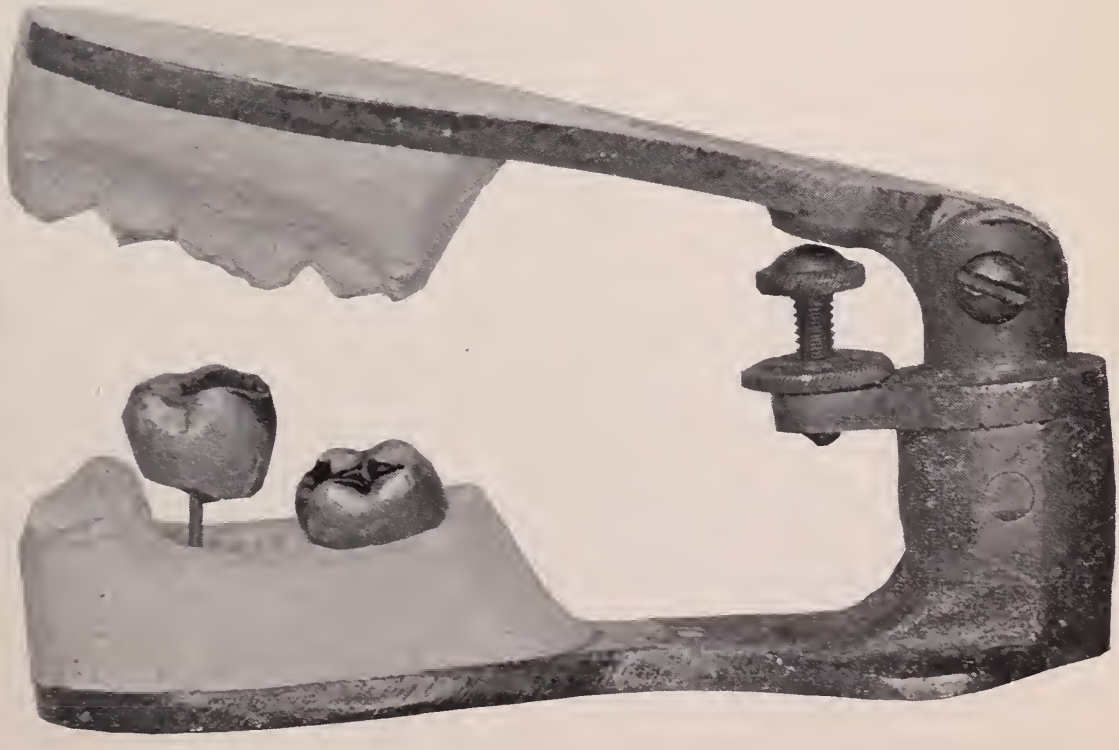

Fig. 5

Fig. 5—Dies mounted in casts on articulator. One die lifted out to show its shape.

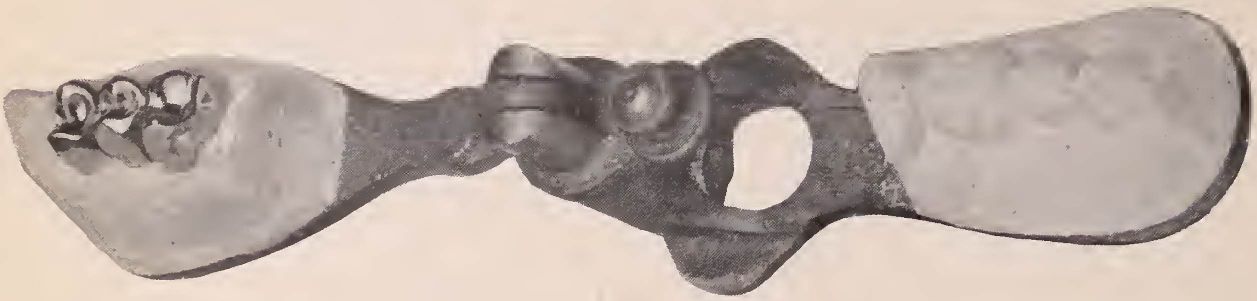

Fig. 6

Fig. 6—Example of pronounced cusp carving with round bottomed defective sulci.

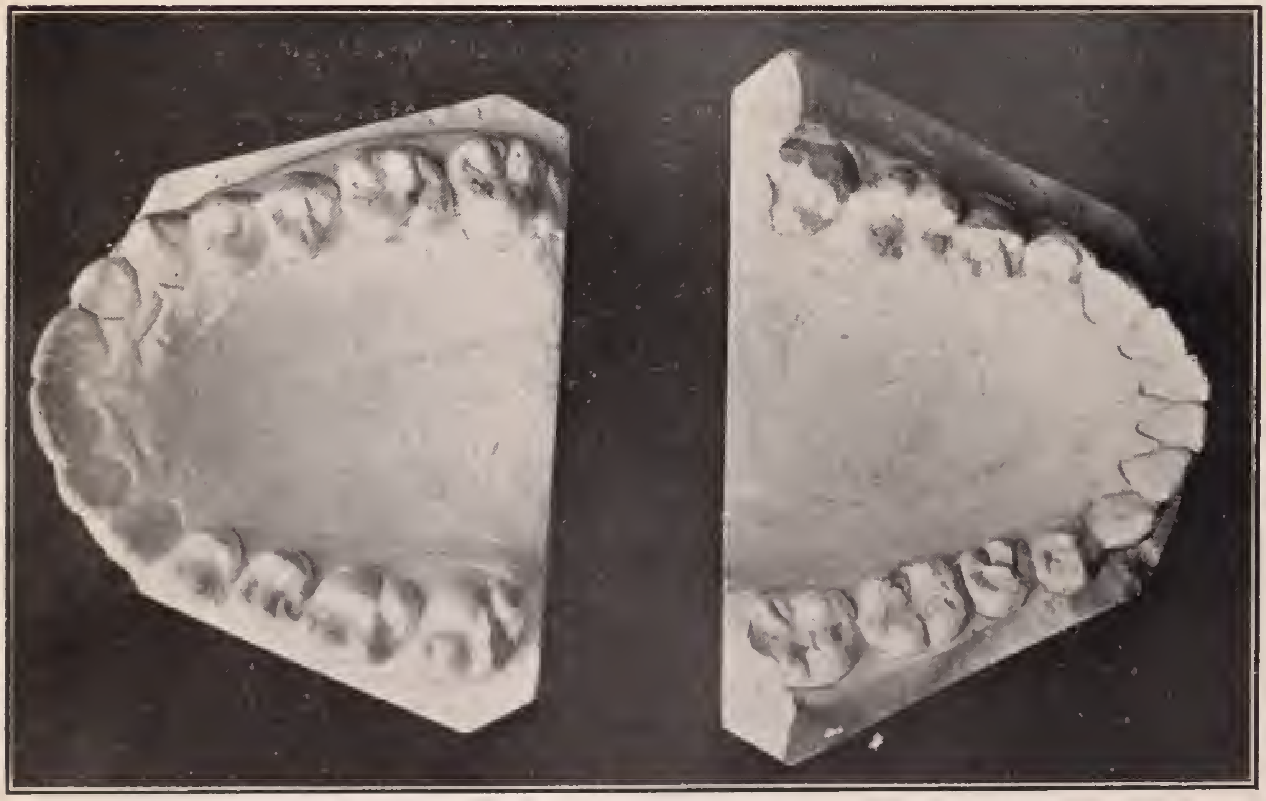

Fig. 7;(a)

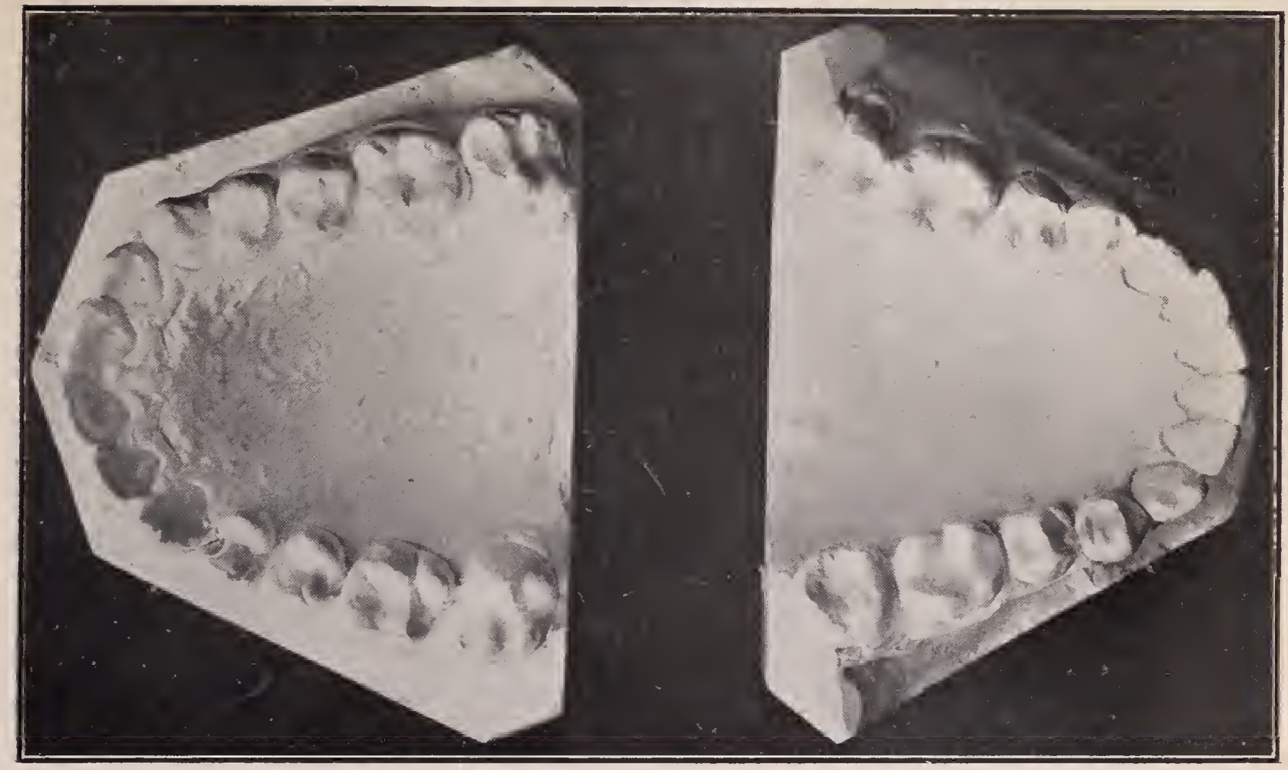

Fig 7 (b)

Fig. 7—Cast from an orthodontia case of Dr. J. Lowe Young's, showing normal condition (a) and condition after inlays were inserted a few years later.

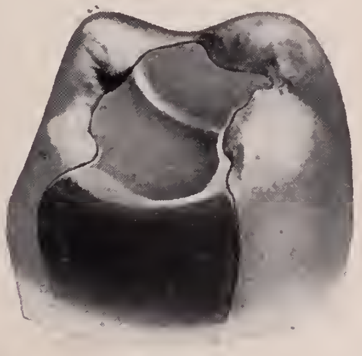

Fig. 8 (a)

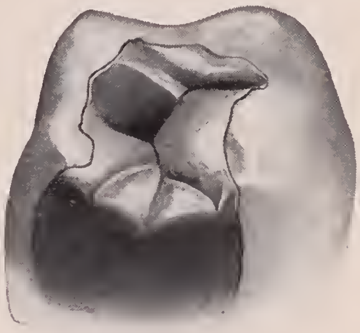

Fig. 8 (b)

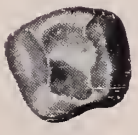

Fig. 8 (a)

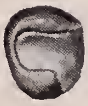

Fig. 8 (a)

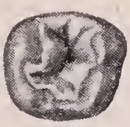

Fig. 8 (b)

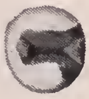

Fig. 8 (b)

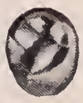

Fig. 8 (b)

Fig. 8—Illustrations of defective (a) and good (b) occlusal surface carving by courtesy Dr. J. Lowe Young and The Journal of the Allied Societies.

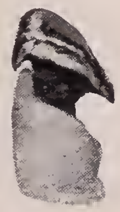

Fig. 9

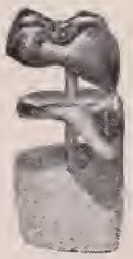

Fig. 10

Fig. 9 —Die and 24K base for complex restoration of molar with over-lap ready to be fitted to the die.

Fig. 10—Die, 24K base, and a 2½ per cent platinized cast cusps for complex molar restoration, the two latter ready for soldering together.

position. The hot wax would soften the material on the other side of the matrix, and cause it to yield under the pressure. Numerous other ways may be equally satisfactory, but this one is efficient and simple.

In the case of double compound cavities with two matrices in the impression a ring of stiff wire slit on one side may be opened enough so as to exert the correct amount of pressure when its ends are applied to the matrices, and a minimum of wax added at the point of contact.

Investment of Impression—The matrix being secure a quantity of plaster is mixed and at the moment when still soft enough to permit of so doing, and yet not so soft as to flow in and cover it, the block of impression material and matrix is pressed straight down into the plaster in such a manner as to leave the impression exposed at the bottom of the opening in the plaster made by the passage of the mass down through it. Careful examination is now made to see that no part of the impression is covered with plaster, and any irregularity in the sides of the hole or pit is filled in so as to avoid needless surplus in the die.

The result is a plaster block encasing the mass of impression material, except with regard to the surface bearing the imprint of the cavity, which lies exposed at the bottom of a hole of a depth equal to that desired for the die, and of a diameter approximating that of the crown of the tooth involved. (Fig.3). As soon as the plaster has set the die may be packed.

Packing the Die—The hole in the plaster as described is the mold into which amalgam is to be packed to form the die. Select any good amalgam in sufficient quantity, and reduce it to a smooth plastic mass, such as is obtained by encasing the mass resulting from triturating in a mortar in a sheet of rubber dam and gathering the rubber tightly around it; or by dropping it into a rubber finger cot, and gripping that closely around the mass, and rubbing the resulting knob vigorously against the palm of the other hand. From the soft plastic mass thus obtained take a small portion and with rounded points and burnishers of such size as are adapted to the impression in hand work it carefully onto the surface of the impression, placing it definitely into all inequalities and small depressions.

As the surface of the impression becomes covered, larger amalgam masses may be used. Finally mallet force on a stick, which nearly closes the opening, heavy pressure with the thumbs, or with a clamp and rubber block may be used to consolidate the mass and expel surplus mercury. (Fig. 4). This work may be conveniently done late in the day and the amalgam allowed to set over night, but by using a quick setting amalgam the time may be shortened. When the die is removed from the impression, imperfections, if any, and surplus near the margins are carefully removed, and the sides of the base are given a slightly tapering shape away from the occlusal surface to facilitate seating and removal from the plaster cast. Usually if one or more dies are to be seated in the same cast, or if the base of the die is of a regular shape, a groove is cut across its bottom so as to indicate its seat in the cast, when working on it at a later stage, without need for trial.

The finished die is then carefully seated in the wax bite. In doing this observe any portions of wax that interfere, and trim them away until the die is accurately seated, depending upon the fit of such portions of the die as you know to be accurate for your guide on this point, and ignoring all parts where surplus has been removed. Having seated the die and waxed it to place, select an articulator, preferably one provided with a lateral as well as a vertical hinge movement, and filling with plaster the portions of the wax bite on the side containing the die, mount it in the usual manner. If the imprint in the wax is to be used for reproducing the opposing teeth, that may be filled also and the mounting completed from the single mix of plaster. If a cast made from a separate impression is to be used it may sometimes be seated in the wax bite at the same time with the die, or it may be seated after the cast containing the die is run and mounted on the articulator, and then attached to its articulator arm. When the wax has been removed, and the surplus plaster dressed away, the result is a replica (Fig. 5) of the conditions in the mouth that permits of free manipulation in carving the wax duplicate with no hindrance from tongue, cheeks, saliva, overlapping and bleeding gums, poor light, difficult access and nervous patient. The wax may be pressed into place with the aid of a matrix, and held under pressure until chilled, the die may be lifted out and all margins exposed to close scrutiny under direct light, the carving may proceed under the most favorable conditions, and at the hands of an assistant, who can, with training and practice, easily produce results in that particular line that excel in perfection the work of the average practitioner. For this branch of the work young women often prove very valuable assistants.

The carving being complete, the process of casting does not vary from that to be pursued in any casting, but when that step is completed the casting is tried in the die, all imperfections interfering with seating carefully noted, and removed, and the rough finishing performed first, then with burnisher and stone the margins are fitted with careful exactness, and finally the inlay, or restoration, is polished ready for insertion.

If the impression has been accurately taken, the die accurately made and accurately seated, the resulting inlay should go to place without any manipulation, and need only to be set in cement. If the contour or occlusion are not exactly right, it is very easy, having the die at hand, to place it in that and grind and polish as desired. The absence of grinding in the mouth is highly appreciated by most patients. For doing the polishing, wheels made from ordinary typewriter, or ink erasing rubber will be found most efficient. The ordinary round typewriter eraser, costing four cents, will make four wheels five-eighths of an inch in diameter, and when once used they become an indispensable adjunct in this work.

In complex restorations, where the whole top of a tooth is to be restored, the indirect process reaches its fullest fruition.

It is a great satisfaction to be able to remove a gold shell crown, whose fit is such that "sloppy" is a mild term for describing it, and on finding that the previous shaping has left the lateral sides intact, to replace it with a hollow cast restoration supplying perfectly every requirement of a useful tooth and every mechanical requirement as to support without the need of a band encircling the root, to foster uncleanliness at the gum margin.

The men who can do in the mouth the required carving for such a case are exceedingly rare, and when such a carving has been completed, with the expenditure of much effort and patience, the risk of a slight mishap spoiling it, and the difficulties of perfecting its fit in the mouth after it is cast, are considered, it is removed from the list of feasible operations.

With the indirect process, however, such a restoration becomes almost as readily feasible as the filling of an ordinary cavity, and the perfection of fit and contour are sources of much satisfaction.

For complex restorations I frequently cast first a 24-karat base (Fig. 9) and fit it to the die, and then cast on it the desired platinized alloy. This results in a very perfectly fitting restoration since the pure gold base is easily manipulated on the die, and any desired degree of hardness is obtainable with the alloyed gold used for the rest of the casting. Usually my laboratory associate prefers to cast this platinized top separately, having formed the wax over the pure gold base in its seat on the die, and after so casting the top to solder the two together. (Fig. 10). In that case he uses one of the well known solders for which the formula has been given us by Dr. Fred A. Peeso. This solder matches so perfectly the color of a 2½% platinum alloy that when used to add a contact point, for instance, it can not be detected, after being well polished.

As this solder is so readily made, and so serviceable, I give the formula here for the benefit of those not familiar with it:

Coin gold, 20k. solder; equal parts; fuse thoroughly on charcoal block and roll thin.

The melting point of the solder is high enough so ordinary 22 k. solder may readily be flowed on it.

Such complex restorations are of great service in restoring badly broken down molars, and with the addition of dowel pins they are frequently most serviceable as bridge abutments.

These steps seem long in the description, but if proper assistance is at hand, the process, as described, can be made to conserve the operator's time and enlarge his earning capacity. Intelligent young women make very satisfactory assistants for this work, and there is no part of it that they can not readily learn to perform.

It remains to be stated that in the case of the practitioner who does all this work with his own hands, there is doubt as to his turning out as much work by following the steps as described as by the direct process, but it is my belief that he will turn out work that will be of greater service to his patients. If that same practitioner will, however, take the needful time to train an assistant to do the routine steps that go on at the laboratory bench, he will find a material increase in his efficiency.

I now desire to call your attention to the need for further development of our technique in the matter of restoration of the anatomical features of occlusal surfaces. All the previous generations of dentists have been working by methods that did not permit, within the bounds of reasonable effort on the part of the operator, or of reasonable endurance on the part of the patient, of restoration of the sulci, ridges, pits and grooves of occlusal surfaces, and even the restoration of cusps was more often than not necessarily omitted. The resulting even-surfaced fillings served ordinarily to preserve the teeth, but not to preserve their full function. Those of you who do orthodontia realize the imperative need for cusp restoration, and I doubt not that some of you have been asked why teeth with large fillings served so poorly as masticators.

At this point, with your permission, I desire to quote a few sentences from an unpublished paper by Dr. J. Lowe Young, read before the Academy of Dental Science, and to be published in "The Journal of the Allied Societies:"*

> "Did it ever occur to you that the orthodontist often works for years to build up this normal occlusion, only to have it pulled down in a day by ruthless extraction of a single tooth, or by the lack of restoration, by the general practitioner, of cusp contour or approximal contact in making fillings or inlays?
>
> "It would seem, therefore, that the dentist must share the responsibility of the orthodontist in emphasizing the importance of normal occlusion by preserving it at all times, and at least by not destroying it.
>
> "Hence, if the general practitioner is to properly restore any part of the dental apparatus, he, like the orthodontist, must have in his mind's eye the forms, surfaces and positions of the dental organs when normal.
>
> "The value of proximate contact, the proper occlusion of each cusp, the size of each fossa, and the direction of each sulcus, should be known to him who aspires to restore or re-create these anatomical forms."

For a time after the introduction of the cast inlay we were fully occupied in coping with the difficulties of technique, and the problems of marginal fit and anchorage. Now that these have become so well understood it behooves us to

*NOTE.—See June 1912, The Journal of the Allied Societies.

consider the fact that the casting process enables us to carve accurate reproductions of any tooth surface with but little extra expenditure of time, and to restore broken down tooth surfaces in a manner that shall leave them very close to normal in efficiency.

I confess, with regret, that my own development in this line has been slow, and I look back with sorrow to large occlusal inlays only two years old because they were finished in the sweeping curves of our earlier technique.

Later on I reached the point of full cusp and sulcus reproduction (Fig. 6) and realized that this meant progress, but cases that satisfied me six months ago I now regard with regret because they were so carved that the bottoms of the sulci could be polished, and this meant absence of the grooves and pits that belong there, and which play an important part in the mastication of food.

The cusps of opposing teeth should never reach the bottoms of sulci. If they do, there is much greater risk of splitting the tooth, and the absence of sharp grooves at the bottoms of the sulci mean lessened masticating efficiency. Compare Fig. 7 (a) and Fig. 7(b), also Fig. 8 (a) and Fig. 8 (b). Since we are now readily able to supply them, there is no longer a legitimate excuse for the absence of sulci, ridges, fossae, grooves and inclined planes from the occlusal surfaces of our inlays and restorations.

They may be carved into the wax surfaces with appropriate instruments, and gravers and burnishers of similar shape may be used for finishing if necessary, but such a surface as is left by the casting process, when carefully performed, with the anatomical features preserved, is of greater service to our patients than polished surfaces with those features absent.

A realization of this fact and the logical action on our part means that in the future a filled tooth will be as useful in performance of function as a sound tooth, and that our work will have mounted to a higher plane of usefulness to the world.

## HOW I PREPARE A CAVITY TO INSERT AN AMALGAM FILLING.*

BY H. J. PATRICK, D.D.S., PAINT LICK, KY.

My clinic is of but small consequence to most who shall read this. Either the operator does not use amalgam at all in practice or else he repeats the operation over and over again each day until he feels little interest in other men's ways of cavity preparation.

To prepare a cavity for amalgam, I only have to think back to college days and remember the little rules my very efficient teachers taught me, all along in a row; first, second, third, etc., beginning like this: the removal of all decay; include all grooves and fissures; leave no thin overhanging margins; cut away all enamel until it is supported by sound dentine; remember convenience form and retention form: make cavity with perfectly flat seat and bevel the enamel margins. This, in a very short way, tells the whole story. If cavities are prepared in this way and the proper care is taken in the insertion of the filling, the operation will be by no means a temporary one, and a better restoration is hard to produce.

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*Clinic at Kentucky State Dental Society, 1912.

> **"The supreme mark of wisdom is the willingness to replace an excellent thing by a better one."**

# THE WORKING MODEL FOR INLAY PRACTICE.*

BY H. W. ARTHUR, D.D.S., SC. D., PITTSBURG, PA.

IT IS NOT the purpose of this paper to advocate the use of the working model to the exclusion of the direct method of practice in making inlays.

The working model method, aside from the fact that it is not so expeditious, has otherwise all the advantages, as well as supplying the means of overcoming difficulties attending the direct method of practice. In any and all cases, an accurate adaptation to the cavity with contact and occlusion, in bicuspids and molars, as well as the more simple cases, can be assured by the working model method. The working model, while specially to be preferred, for the production of porcelain inlays, meets all the requirements for gold inlays. With the working model as it should be, that is, an accurate impression of the cavity, the approximating tooth and the correct occlusion, the operator, in this class of cavities, has control of conditions and the manipulative procedure in a way that he cannot have by the direct method.

Having the porcelain inlay specially in mind, the following advantages may be claimed for the working model:

The cavity can be approached conveniently from all directions, so that the platinum matrix can be more readily adapted.

The porcelain material can be applied with the platinum matrix on the model, thus avoiding the liability to change of form to which the matrix is subject when held in pliers.

Proximal contact and accuracy of occlusion can be gauged on bicuspids and molars, and more readily attained with the anterior teeth.

Several inlays (there need be no limit to the number) of different shades may be made with but little more expenditure of time than for one, thereby giving a choice of the one best suited to the case.

It supplies the means, in case of an accident, of repeating the operation without annoyance to the patient.

Nicety of detail can be worked out at leisure.

The model, properly registered, with shade record, may prove convenient for future use. Aside, we might add, that the temptation to insert a "good enough" inlay cannot be so readily excused.

The above will apply equally to the gold inlay, where the procedure is in common.

To insure the best results, the working model must be an exact reproduction of the cavity and surroundings, as found in the mouth. This necessitates that, not only should the impression be accurate, but that there should be no change of bulk or form. Experience has demonstrated that modeling composition and copper amalgam supply the materials that meet these requirements. Where there is direct access to a cavity, a good impression can be taken by the simple method of shaping the modeling composition to a point and then softening the point. This, with the harder composition to give resistance, can be forced to all parts of the cavity and cavo-surface angle.

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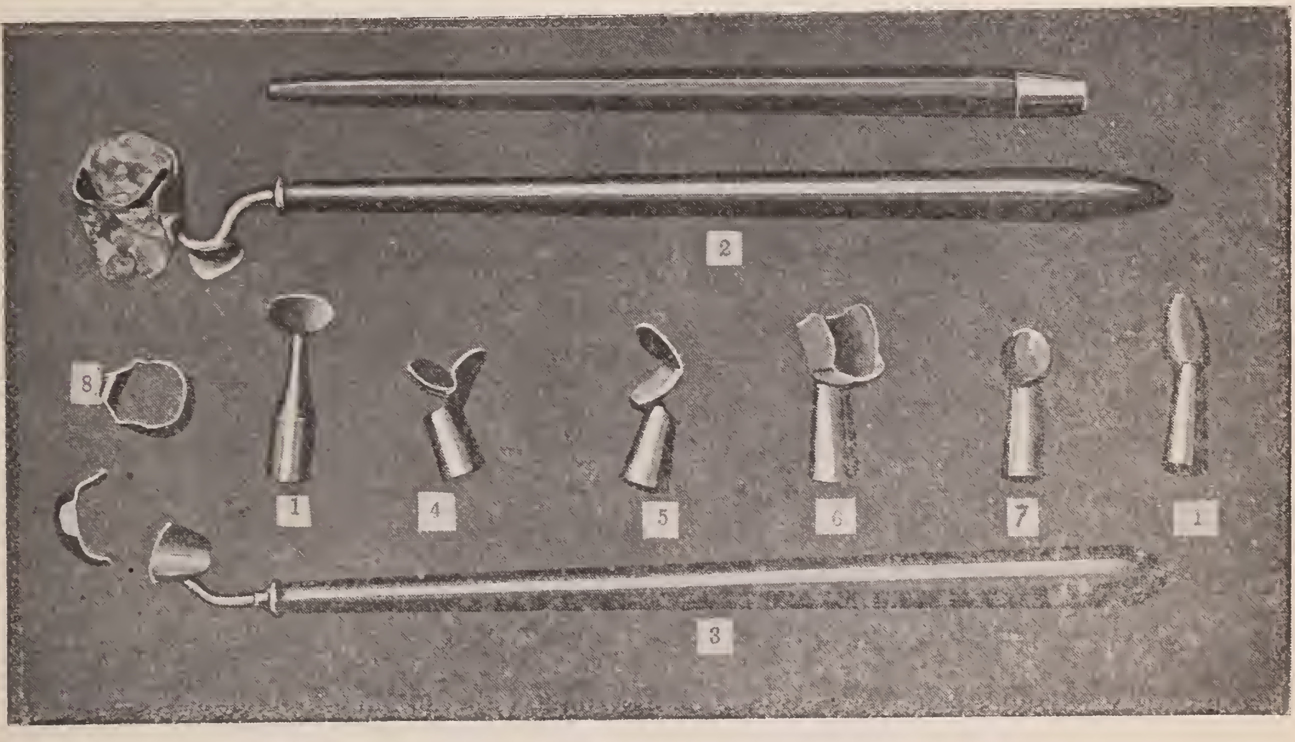
*Read before the West Virginia State Dental Society, 1912.

In most cases, however, a suitable cavity tray is necessary to give resistance to force the impression material to the distant parts of the cavity and cavo-surface angle, as at the cervical margins of proximal cavities and under the gingiva-labial surfaces.



To meet these requirements, your essayist has contrived a number of cavity trays, described as follows:

No. 1. Designed for taking impressions under the labio-gingival margins of the anterior teeth.

Nos. 2 and 3. Designed for taking impressions (rights and lefts) of the proximal cavities, mesial and distal, of the anterior teeth.

Nos. 4 and 5. Designed for taking impressions of mesio-occlusal and disto-occlusal cavities of bicuspids and molars.

No. 6. Designed for taking impressions where the lingual or buccal portion of a tooth is wanting.

No. 7. Designed for taking impressions of labial, buccal or occlusal cavities.

No. 8. Designed for taking impressions of disto-occlusal cavities of third molars, including the occlusion.

A more recent device has, in a measure, taken the place of Nos. 4 and 5. It is designed not only to take an impression of the cavity, but includes proximal contact and occlusion. So that, mounted on the articulator, we have all the conditions of the mouth.

The device is simple, designed to confine the impression material; can be made in a few minutes. The same appliance has been used by your essayist as a matrix in the operation of filling for years. It consists of a thin piece of sheet metal, shaped to pass above the cervical margin and around the embrasures of the tooth, with a lip turned down to rest on the ridge of the proximating tooth. The appliance when in place on the proximating surfaces of bicuspids or molars, as the case may be, should be wedged lightly at the cervical portion with cotton, where there should be a slight yielding, so that the impression material may pass over the margin of this portion of the cavity.

The lip resting on the ridge of the proximate tooth prevents the forcing of the appliance onto the gum when taking the bite. The parts of the appliance passing around the embrasures should be free and yet not enough so to allow the impression material to pass around the embrasures to the extent that it will interfere with the withdrawal of the impression.

Sufficient impression compound should be used to fill the cavity and cover the occlusal surfaces of the adjacent teeth. The patient should be instructed to bite and give lateral motion. With the impression in hand, copper amalgam is prepared for inserting, in the usual way. It should be inserted with care, pressed well onto the thin margins, over the impression of the cavity and embrasures, and well onto the occluding surface of the tooth. It is better to wait until the amalgam has hardened before completing the mounting on the articulator.

On the articulator the slight obstruction to exact occlusion, caused by the lip of the matrix, is corrected in the absence of the obstructing lip.

The thickness of the matrix does not interfere with securing the correct proximal contact. The working model should supply all the conditions of the mouth; it has, in addition, all the aforesaid advantages for manipulations.

The appliances we have described are so readily made, and the taking of an impression so simple, that it is well to have it at hand, even though it may only be for contingencies.

Where the occlusion and contour can be allowed, as in the anterior teeth or on exposed surfaces, the copper amalgam counter of the impression of a cavity can be mounted in plaster in a suitable receptacle, thus supplying a convenient means for forming the platinum matrix by the use of the water bag, under screw pressure, and for correcting the shape of the matrix, if need be, after the first fusing of the body in the matrix.

The convenience of the working model for making gold inlays is too obvious to enlarge upon it.

Having as an object the insuring of the best results, as a means to that end, the working model has a place not only in inlay, but in other lines of practice.

## ABSTRACT OF DISCUSSION

**Dr. Frank L. Wright**, Wheeling: I should like very much to have seen a copy of Dr. Arthur's paper. I have never used copper amalgam. I have used Dr. Weston A. Price's method of artificial stone, which is perhaps not as good, but I have had some very good results especially in proximal cavities between bicuspids and molars. I have made four fillings at one time, using artificial stone; separating a little to get the contact point, and have had results in fillings dropping right into place with a beautiful contact point. The advantage of any model is the almost complete finishing of your filling before putting it in the mouth. You can polish the filling on the artificial stone down to a very fine edge, with little extra work necessary after cementing your filling. The only method I am familiar with is the Dr. Price method. He has different little impression cups for taking impressions. He uses a wax, and the artificial stone is mixed up and put in the wax after it hardens, and the stone does not harden until after heat is applied, and you can make a good model in that way. Your casting wax is then molded right into your cavity, contouring it the same as Dr. Arthur has told us about; and you can get perfect occlusion. Finish your filling, and if you have two or three proximal cavities using his articulator, breaking your model apart. It is nicely adjusted so it can be opened for contouring, graded down to the milometer; spread your teeth just a little and your fillings will go in in very nice shape.

Dr. L. G. Beerbower, Terra Alta: I am sure we have all appreciated this paper very much and will gain many splendid points from it, but I have not used the method enough, have not endeavored to put it into practice, to discuss it. I know it is a good method from a common sense standpoint.

Dr. Arthur (closing): I have endeavored to put it into as few words as possible and make it as plain as possible. I claim considerable originality in what I have produced there, and I am satisfied when you see it in clinic you will see that it is a valuable means in producing results. That is what we are after.

As to Dr. Price's method, I know of it; have practitioners nearby who follow it up, but I think my method is simpler than Dr. Price's and have something in reserve. In Dr. Price's you break up your model, but I have had the impression that in breaking that up you are likely to injure your filling. I regard it as a good method; I wouldn't place this method in contrast with it at all; I am satisfied that it is good and have been prompted to take it up, but have not just done so, probably because of my own scheme.

# FILLING A PULPLESS TOOTH.*

BY J. A. LIBBEY, D.D.S., PITTSBURG, PA.

I found the posterior root of this inferior molar had been perforated with a drill, and as there was pericemental inflammation, I put in a treatment, and consequently did not complete the operation. The process of filling, had the tooth been in condition, would have been to dilate the canals, using 50 per cent sulphuric acid (C.P.), followed by sodium-potassium, carrying it into the canals with a barbed broach; then, using a smooth broach, wrapped with a few fibers of cotton moistened with 25 per cent pyrozone, thoroughly clean and sterilize the canals. Then dry with paper points until there is no sign of moisture: place creosote in canals and, with a smooth broach, displace the air; a few drops of chloroform will displace the creosote, and use fine gutta-percha points until the dissolved gutta-percha becomes quite stiff. If the gutta-percha contracts it will be lengthwise, not laterally, and you will have the assurance that the apical end is closed, as I demonstrated with the glass tubes.

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*Clinic at West Virginia State Dental Society, 1912.

# REPORT OF THREE ORAL SURGERY CASES, TWO OF WHICH ARE EXCEEDINGLY RARE.*

BY C. H. OAKMAN, D.D.S., M.D., DETROIT, MICH.

## SURGICAL TREATMENT OF A CASE OF BLASTOMYCOSIS

Mrs. H., aged thirty-five years. On examination of the lower right jaw, in the region of the bicuspids and molars, I found a suppurative condition of the gum tissues. Exploration of the parts was made by the use of a sharp steel instrument. The bone was found considerably disintegrated. An incision was made from the cuspid to the second molar. The diseased bone was removed by the use of surgical burs and currettes, under local anesthesia.

The wound was treated with tincture of iodine and frequent syringing with boric acid (saturated solution).

Blastomycosis + 250.

The curettings were sent to a pathologist for examination, who pronounced it a case of Blastomycosis. The patient was given systemic treatment in the form of large doses of potassium iodide, and made an uneventful recovery.

This is, indeed, a rare disease, and is, to my knowledge, the first case of Blastomycosis of the mouth recorded in Michigan.

## OSTEOPOROSIS OF THE LOWER JAW

Mrs. H., aged fifty-three years, had suffered six years with neuralgic pains in both jaws. All of her teeth had been extracted before coming to me with the hope of obtaining relief. This did not lessen the pain but rather accentuated it.

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*A talk before the Michigan State Dental Society, 1912.

I induced her to have a radiograph taken, which showed the bone to be entirely obliterated. The patient had taken all kinds of cure-alls, but without avail. She was so nervous and fearful of an operation that I have been unable thus far to gain her consent. Should an operation be performed at this time it would be necessary to remove all but the periosteum.

My belief as to the etiology is one of two things, either spyhilis or tuberculosis—the former more likely. I have also been unable to have the patient consent to a Wasserman test. If made and a positive reaction be present, she should be treated systemically. (Osteoporosis specimen.)*

It is possible, after systemic and surgical treatment, that the jaw might be partly reproduced. I would further state that there was nothing abnormal about the gum tissue, cheeks or tongue that would indicate other pathologic conditions. The objective symptoms were extreme pain and tenderness on pressure of the lower gums, chin and cheeks. The paroxysms would last for several days, when the patient would have to remain in bed. There would be a partial cessation of extreme distress, but at no time was she entirely free from pain.

Osteoporosis of lower jaw.

A local anesthetic was injected into the gum tissue between the symphysis and the angle of the jaw and a sharp steel instrument passed buccolingually into the mouth, which proved clinically that the jaw had lost its inorganic substance.

## FIBROID TUMOR OF THE LOWER LIP AND JAW

Mrs. S., aged forty-five years, consulted me regarding a tumor involving the lower lip and jaw. The tumor extended over the whole inside of the lip, at the same time being attached to the anterior portion of the gum. This tumor was peculiar from the fact that when the lip was drawn upward and outward it had the appearance of an accordion. When the lip was released the mass of tissue would fall back over the anterior ridge of the jaw to the extent of about one inch or more.

A local anesthetic was injected in several places about the growth. An incision was made from the corner of the mouth, just inside the vermillion border, to the opposite angle and down on through the gum tissue to the process until we reached the posterior border, which was fully an inch and a half from the ridge.

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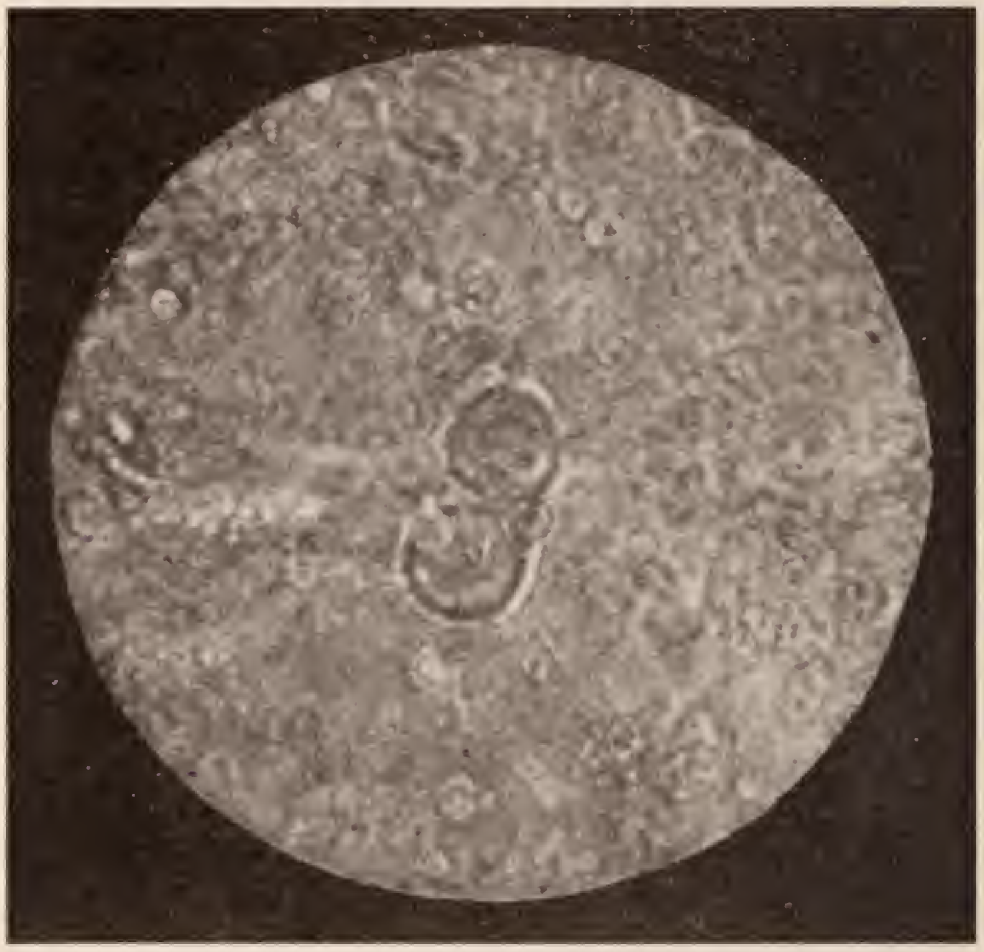
* NOTE: Osteoporosis specimen shows disintegration of bone.

A transverse incision was made at the base or lingual surface of the tumor extending to the opposite side, thus making an incision around the tumor. After dissecting the tumor from part of the lip, I was enabled by the use of the handle of the knife, to work down to the anterior surface of the jaw. Then, by the use of a gouge, I was able to remove the growth from the process without much effort.

A profuse hemorrhage followed. No special bleeding point being observable, various methods were used to control hemorrhage—pressure, hot sponges, adrenalin chloride and persulphate of iron (powder form). The latter gave the best result, although adrenalin powder would have been the proper agent in this case. Care should be taken that the patient does not absorb too much of it for fear of raising the blood pressure.



Fibroid tubor removed from lower lip and jaw.
Blastomycosis + 500.

An hour after the operation the patient left for home, but upon reaching the ferry had to return to the office on account of recurring hemorrhage. The same methods were used as before and the patient kept as quiet as possible, in a reclining position. In about an hour she was allowed to go home.

The wound was kept clean and treated with a stimulating agent.

(Specimen of tumor.)*

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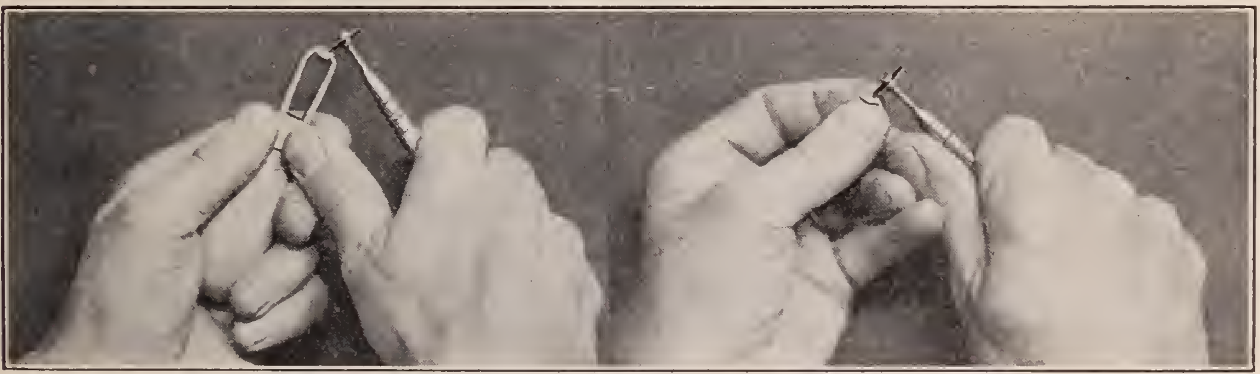
* Note: Specimen shows fibroid tumor removed from lower lip and jaw.

## SOME MORE PROGRESSION.

BY R. C. BROPHY, M.D., D.D.S., CHICAGO, ILL.

The dental profession is a progressive body. It may be that some of its members did not vote the Bull Moose ticket at the late election, but it is probable that if they did not, they voted for Mr. Wilson through a belief that he is just as progressive as is Col. Roosevelt.

Especially are dentists, as a body, progressive in considering new ideas pertaining to practice. Very few innovations are introduced that are not followed by a general looking up and taking notice, and a general manifestation of a purpose to investigate: but when a new idea has been tested and found worthy of adoption, they exercise no less progressiveness in acquiring the best facilities obtainable for the application of that innovation in their work or practice.



It has been observed by a good many, however, that while dentists are actuated in their progressiveness in adopting new methods of practice by a desire to subserve the best interests of their patients, when it comes to the matter of doing the work their progressiveness is actuated by pure, all-wool-and-a-yard-wide selfishness. For instance, Dr. J. C. Y. Moore, of Aurora, Ill., believes, with a great many of his brother dentists, that the best way to conserve the interests of patients who have decayed teeth, in a large percentage of cases, is to make and insert inlays in the cavities, and he does it.

Dr. Moore, one day, made an inlay, and was intently at work finishing it to the degree usually considered before insertion, when it flew from his fingers and alighted through an aperture of a floor register. Dr. Moore, just at this time, began to forget about his patient, and commenced to think about Dr. Moore. The inlay was recovered. It was a small inlay, and as Dr. Moore pinched it harder and as the little disc played upon the inlay and upon Dr. Moore's thumb and finger in a mutual manner, he thought more and more of Dr. Moore. The patient was forgotten wholly, brotherly spirit lay dormant in his breast, and no thought of even floor registers or sore fingers, other than his own, entered or emanated from Dr. Moore's mind; but the idea was then and there born therein that he would try to make some kind of a holder that would hold Dr. Moore's inlays while being finished. Dr. Moore did set about it, and the process of evolution finally developed a perfectly practical instrument, an efficient little device for that purpose.

It was a clear case of progress being pushed ahead by pure, unbridled selfishness. No consideration of the uplift or maintenance of patients' interests, nor of anyone else's interests save Dr. Moore's, had a thing to do with the pushing.

As a matter of fact, the latent disposition of Dr. Moore to be of service to his brother practitioner by offering to let him share the benefits of his instrument would have continued to sleep had it not been for the persuasion of the writer.

It would be all right sometimes, and, as a matter of fact, would be better lots of times for a man to hide his light under a bushel, but it is positively wrong for a member of the Christian-spirited profession of dentistry to keep as good a thing as Dr. Moore's inlay vise out of the hands of his professional brother. He might let him chase the festive collar button down his back, under the dresser, or any other place, but he should not let him chase the inlay, if he can prevent it, as Dr. Moore can do.

The cut shows the two styles of Dr. Moore's vise. The one at the right comprised by his willing but inappropriate fingers, which he condemned, and abandoned, and the one at the left, much simpler in construction, yet excelling it in every essential, which he has substituted therefor.

It is unquestionable that dentists feel that if they had an instrument which would hold inlays of every size and every form in a perfectly rigid grasp on the end of a handle nicely fitting the clasped hand, and thus holding it without contact with the fingers or obstructing the view, operate upon the outer surface and margins, a long and urgent need would be met.

Having been instrumental in getting Dr. Moore to make his instrument available to the profession, I am writing this because I regard it equally important that attention of the profession be called to it.

## PARTIAL PLATE.

BY L. GEO. BEERBOWER, D.D.S., TERRA ALTA, W.VA.

This is a method of strengthening a partial plate. We often have trouble from breaking of partial plates. By leaving the outer rim off it weakens the piece, and wires and bars recommended by supply houses for this purpose are usually of very little use for the reason that rubber does not adhere to the metal. Australian metal, manufactured by the S. S. White Manufacturing Co., seems to fill a long-felt want for this work, and strengthens the denture very much, because rubber passing through those holes and the holes being countersunk on the lingual side, it forms a head on the projections of rubber, thereby adding great strength to the denture and allowing it to be made the minimum thickness.

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*Clinic at West Virginia State Dental Society, 1912.

# SOME OF THE IMPORTANT POINTS IN DENTISTRY THAT ARE UNDER DISCUSSION AT THE PRESENT TIME.*

BY M. H. CRYER, M.D., D.D.S., PHILADELPHIA, PA.

DENTISTRY, like all other progressive professions, is constantly changing, and each of these changes must be tested by practice and discussion pro and con from various standpoints. This evening we will look at some of these developments from the oral surgeon's point of view.

Marked advancement has been made by the various specialties that have evolved from general practice. The demand for better work in each branch has compelled the dentist to confine himself more or less to that particular line for which he is best adapted; so that we have men who are devoting all of their energies to orthodontia and working out the best methods for correcting irregularities of the teeth; others are working solely on perfecting crown and bridgework or other lines of prosthetic dentistry; the oral surgeon, who is devoting himself exclusively to surgical work associated with the mouth, and so on throughout the scope of stomatology.

It is, however, in operative dentistry that the greatest change has taken place. It was but a few years ago when one was severely condemned for suggesting the use of anything but gold for filling teeth, but during the last ten years the exclusive use of gold has been superseded to a great extent by that of plastics, for even the gold or porcelain inlay is held in place by a plastic material, and the leading dentist of today is using very little gold compared to the amount he would have used ten or fifteen years ago. The sale of gold as a filling material has markedly decreased, while there has been a tremendous increase in the quantity of the various plastic materials sold. The renowned gold workers such as Atkinson, Webb, Morgan, McKellops and others of similar ability are not being reproduced, but today men are giving more careful attention to the best methods of filling teeth, using that material which seems best suited to each particular case, and considering always the physical and nervous endurance of the patient.

In crown and bridgework the improvement in the last decade has been great. I am, perhaps, more familiar with this specialty of operative work, because a great deal of my practice as an oral surgeon once came from the mistakes of these good men. The various disturbances arising from oral sepsis caused by ill-fitting crowns and misplaced bridges upon roots that should have been extracted usually come to the surgeon for the final treatment, but I am glad to say that the oral surgeon is not kept nearly so busy today with this class of work as he formerly was, although I have heard medical men strongly condemn the whole practice of crown and bridgework, claiming that many of the most stubborn cases of intestinal disturbances result from sepsis produced by some atrocious work of this kind.

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*Read before the Odontological Society of Western Pennsylvania, 1912.

It is highly necessary for the man who makes a specialty of crown and bridgework to see first, that the roots upon which he places crowns are in healthy condition, and then that his appliances are so perfectly finished and adjusted as to preclude the possibility of leaving any lurking spaces for germs. One of the greatest problems facing the entire dental profession today is the improvement and perfecting, if possible, of all dentures and appliances that are to be placed in the mouth. The ideal condition of such would be, perhaps, to have everything of this nature so made and adjusted that it could be removed at least once a day and thoroughly cleansed. I have heard several radical oral surgeons and general medical men say that, except for the saving of the contour of the face, they would much prefer, for the good of general health, that a person be edentulous rather than to have an appliance in the mouth. It is generally conceded that the value of false teeth and crowns for masticating purposes is not so great as is often supposed, for one could do much better work in preparing the food for the stomach with a few solid teeth or even with the gums, than with crowns, artificial dentures and the like, that cause sore places or even tenderness in the mouth, as this tenderness is the great cause of bolting the food which is so strongly condemned by all.

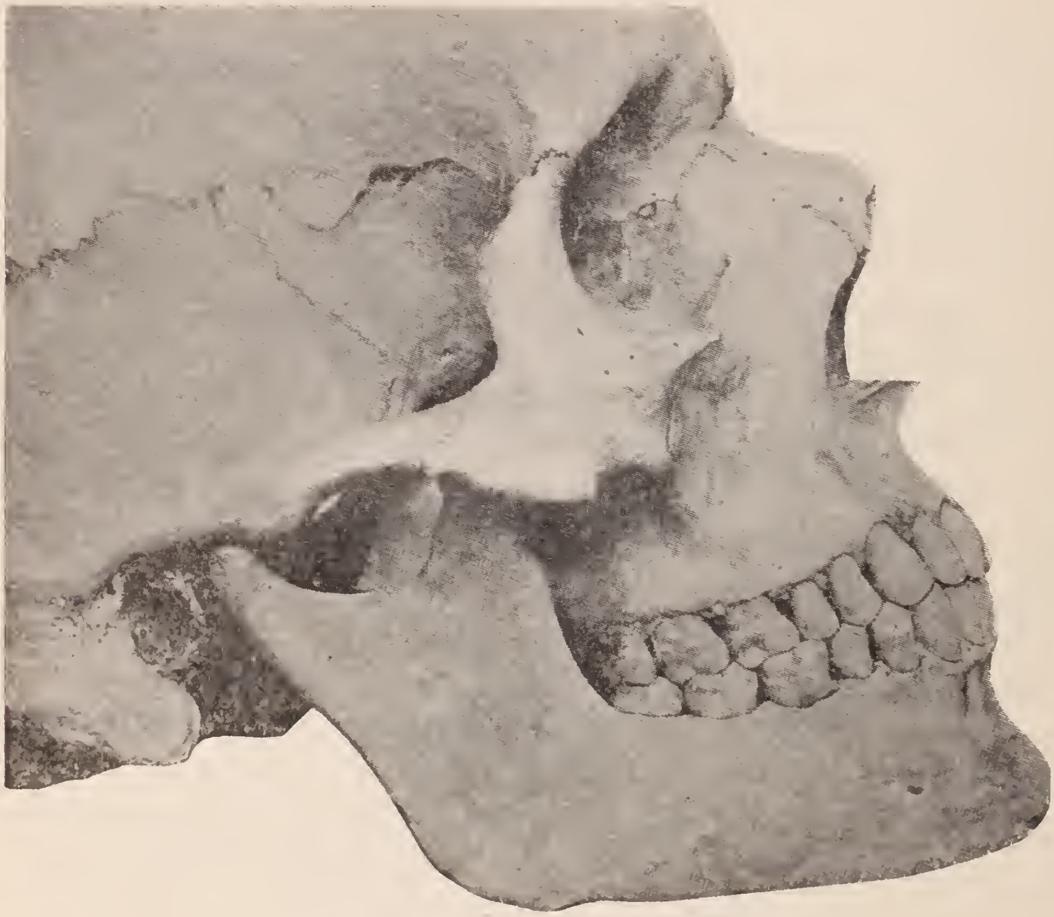

Fig. 1

Side view of upper and lower jaws of a Caucasian skull, showing typical occlusion of the teeth.

In orthodontia the progress has been very good, and is steadily working out for the betterment of the patient. The orthodontist is realizing more and more that he is working in the mouths of living subjects, and that he must consider the general health of a nervous child before his ideal of alignment.

The men of this specialty who have done the best work do not necessarily belong to the new school or to any other school, but are broad-minded men who, having studied the anatomical structures of the face with the physiological and pathological bearing of many variations, are able to correct existing irregularities in an intelligent manner with a thoughtful care of the general health. I find the younger men of the profession taking a keen interest in anatomy and physiology, and so becoming more observant of the pathological conditions which produce the variations with which they are dealing. The ideal orthodontist will also use his appliances in such a manner as to avoid the possibility of oral sepsis.

There is, perhaps, more discussion going on in this specialty at the present time than in any other branch of dentistry, particularly with regard to the advantages to be gained by the widening of the dental arch. In connection with this subject I would like to show a few slides illustrating *normal anatomy* and also some exhibiting pathological conditions which confront the orthodontist in his endeavors to correct irregularities produced by accident or disease.

Illustration No. 1 shows a side view of the skull of a white person at about twenty-five years of age. The teeth are in good alignment and normal occlusion for a person of this character and age. It is an ideal model for the orthodontist to have before him when correcting irregularities, provided the patient's face and teeth possess the same character and formation that we have in this skull; otherwise it would be of little use. One of the greatest mistakes made by orthodontists today is that they are too liable to take as models any good looking jaws where the teeth are in regular alignment, shape and occlusion, regardless of the fact that these regular types may not suit specific cases at all. One of the prominent teachers of orthodontia in this country has shown a prognathous negro skull as a model for his pupils to follow in the correction of alignment and occlusion. The teeth of the particular skull before you may be in absolutely correct position for the individual at that age, or about maturity, but this would not be the correct position of the teeth for the same individual much before that time.

The orthodontist should remember that the tooth germs and the teeth change position from the time they commence to develop until they are lost, the greatest rapidity of change usually taking place before maturity. Every tooth has a normal position, changing from day to day, and if the orthodontist carries the tooth out of that position he is producing an abnormality.

Again referring to Illustration No. 1, we can say with pretty good assurance that there has been neither general nor local pathological conditions to disturb the formation of the jaws while undergoing development, and I feel confident that no mechanical appliance has been used to bring these teeth into their beautiful alignment and occlusion.

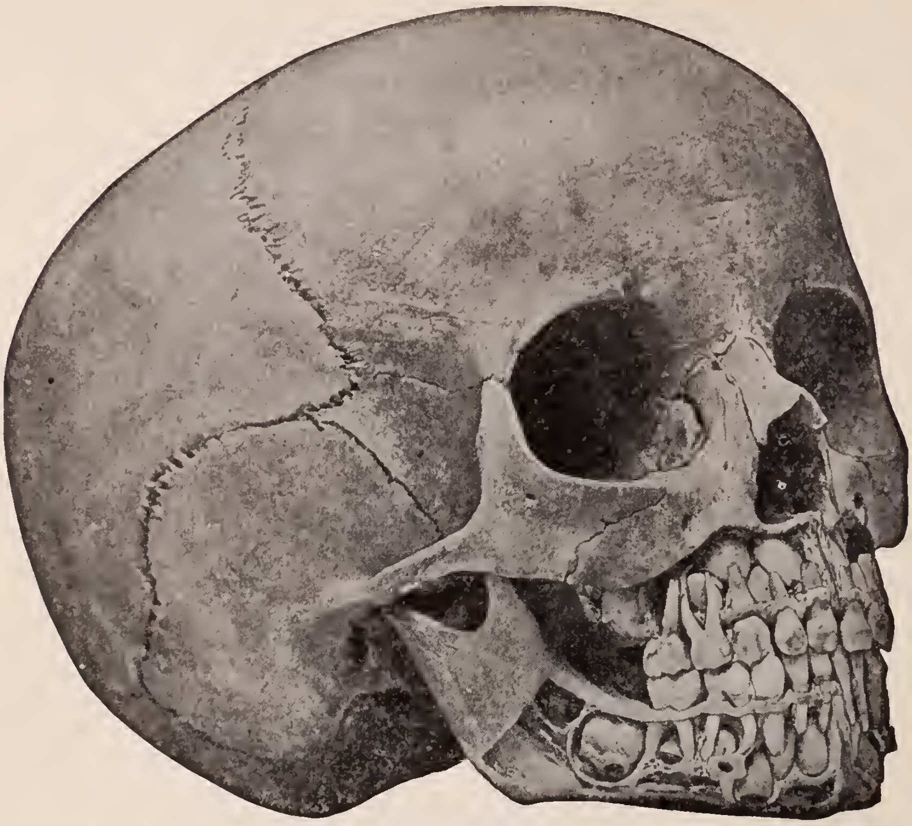

Fig. 2

Illustration No. 2 is that of a child's skull at about six years of age. The outer cortical portion of the bone has been removed, showing all the deciduous teeth and their roots in their normal positions. The crowns of the developing permanent teeth are also shown in their normal positions for this age.

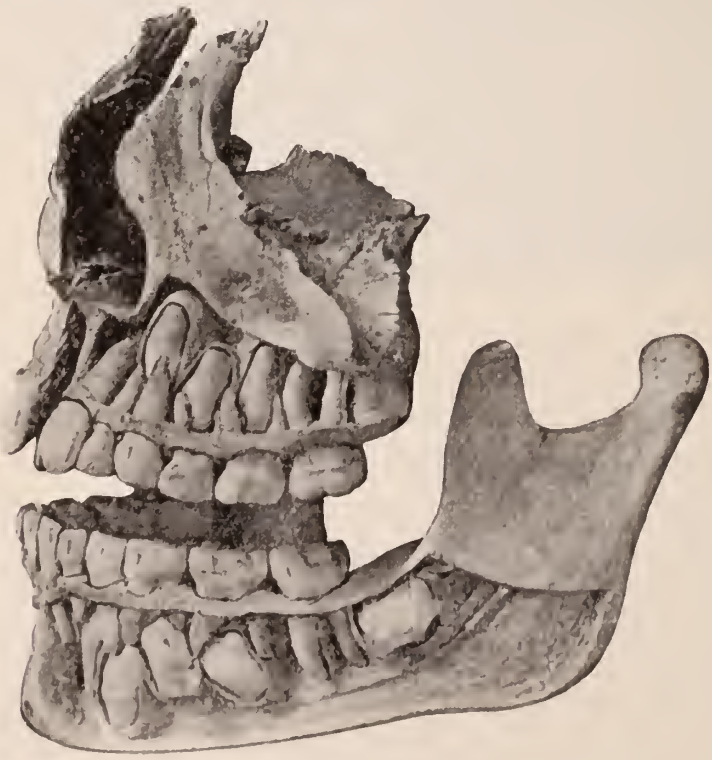

Fig. 3

Side view of the upper and lower jaws of a child about seven or eight years of age, showing the deciduous teeth, the first molars, and the germs of other permanent teeth.

Illustration No. 3 is of the same character as Illustration No. 2. If no pathological or mechanical interference takes place, these teeth will assume their normal positions for each day of the life of the patient up to maturity. If mechanical appliances injudiciously interfere with their normal arrangement a result may be produced somewhat similar to the popular cartoon of the day.

Illustration No. 4 is made from a Caucasian skull where the external cortical plates and a portion of the cancellated tissue have been removed. This shows the normal condition of the internal structure of the alveolar process and the relation of the teeth and the cancellated tissue to the forward to the region below the canine tooth and then returns upward and backward and terminates in the mental foramen on the outer surface of the jaw. A number of small branch tubes run from the main tube to the roots of the teeth. It will be noticed that the small tubes extend upward and forward in a curved manner and that the roots of the teeth are curved or inclined in about the same proportion. This is caused by the general forward movement of the teeth during the development of the bone and the growth of the roots. When the first permanent molar develops, room has to be made for it. This is done by movement of the two deciduous molars and their successors, the bicuspids or premolar teeth, which pass forward

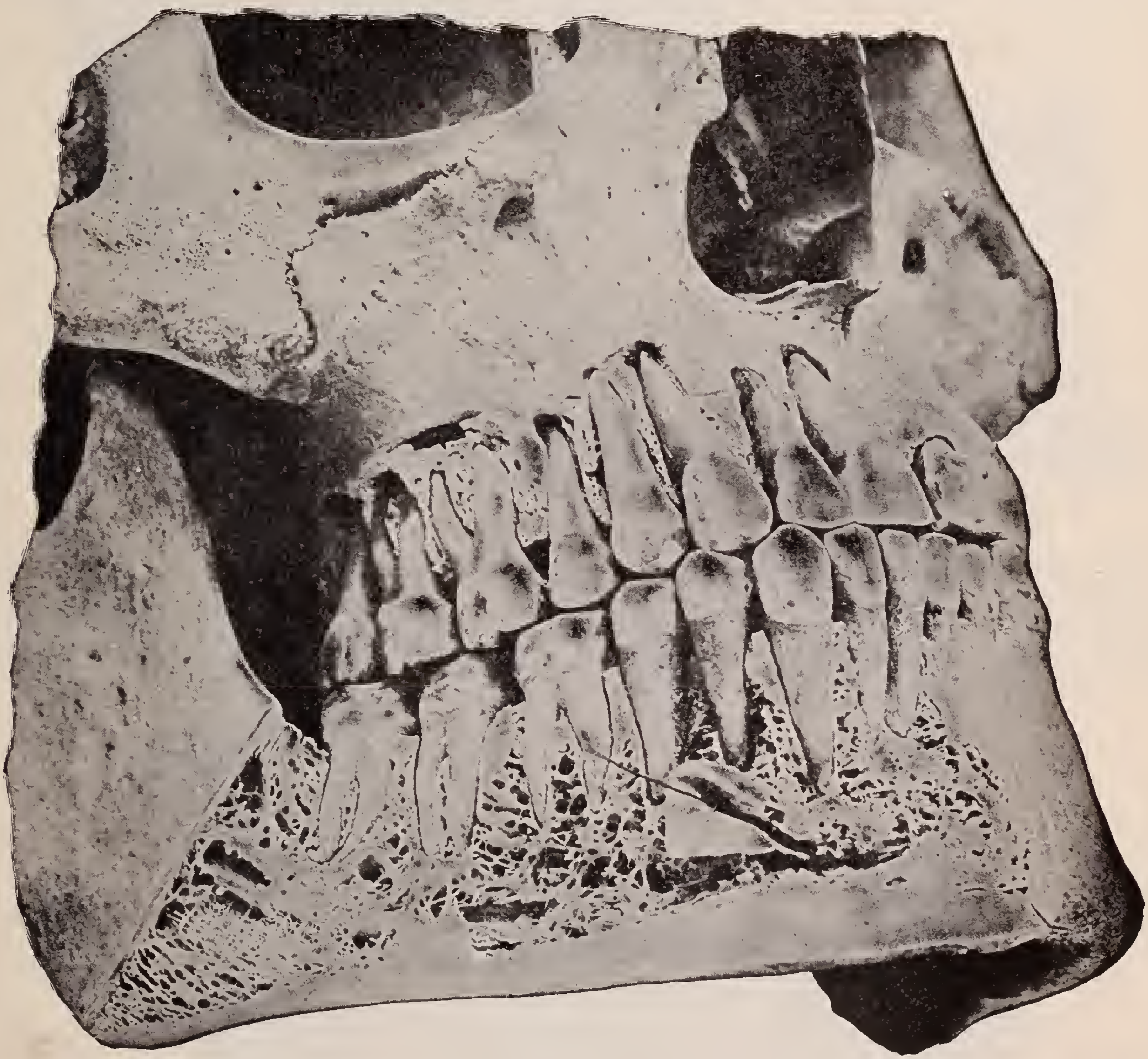

Fig. 4

Antero-lateral view of the upper and lower jaws, with the external plates of the alveolar process and some of the cancellated tissue removed, exposing the roots of the teeth and the cribriform tubes.

within the U-shaped cortical bone, and also by the interstitial growth of the body of the jaw. When the second molar develops more room has to be provided, and the same when the third molar develops and erupts into place. During this period of development and growth a pathological condition, either local or general, may produce in the cancellated tissue a superabundance of lime salts *which bind it to the cortical wall of the mandible,* thus preventing the *proper movement of the cancellated tissue and the teeth.*

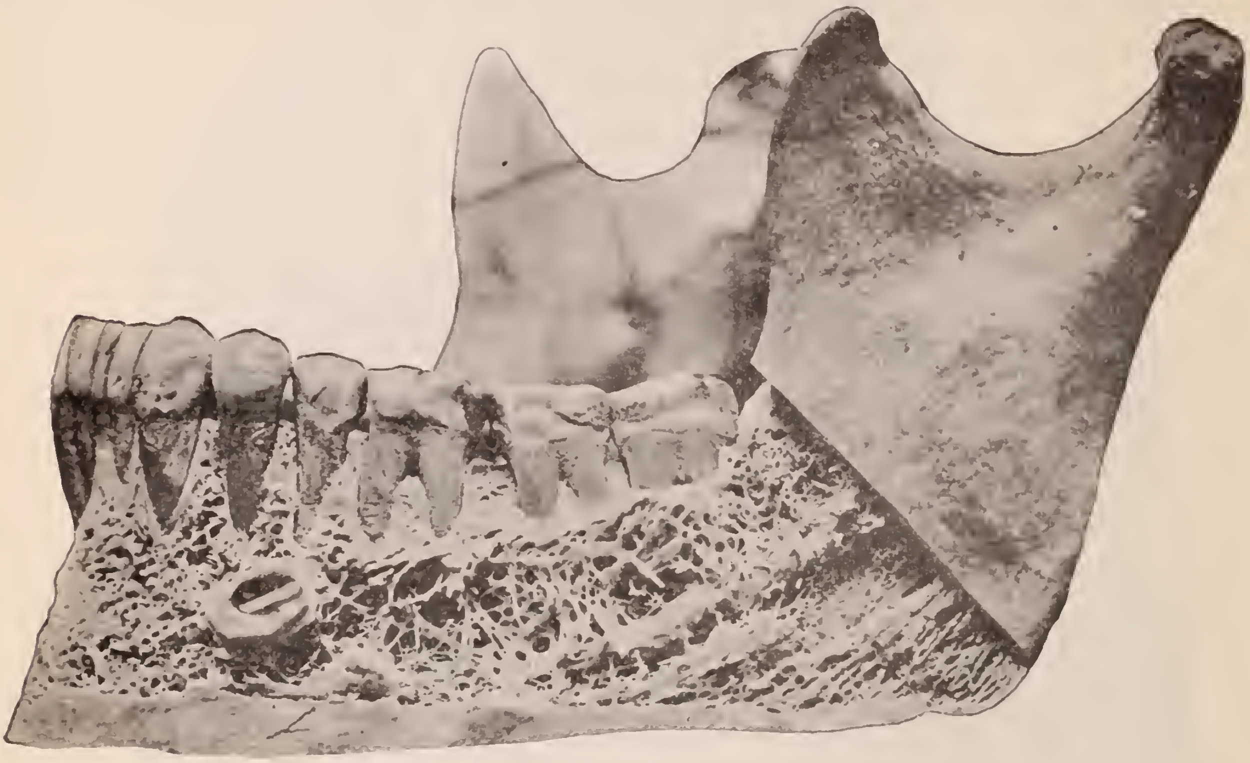

Fig. 5

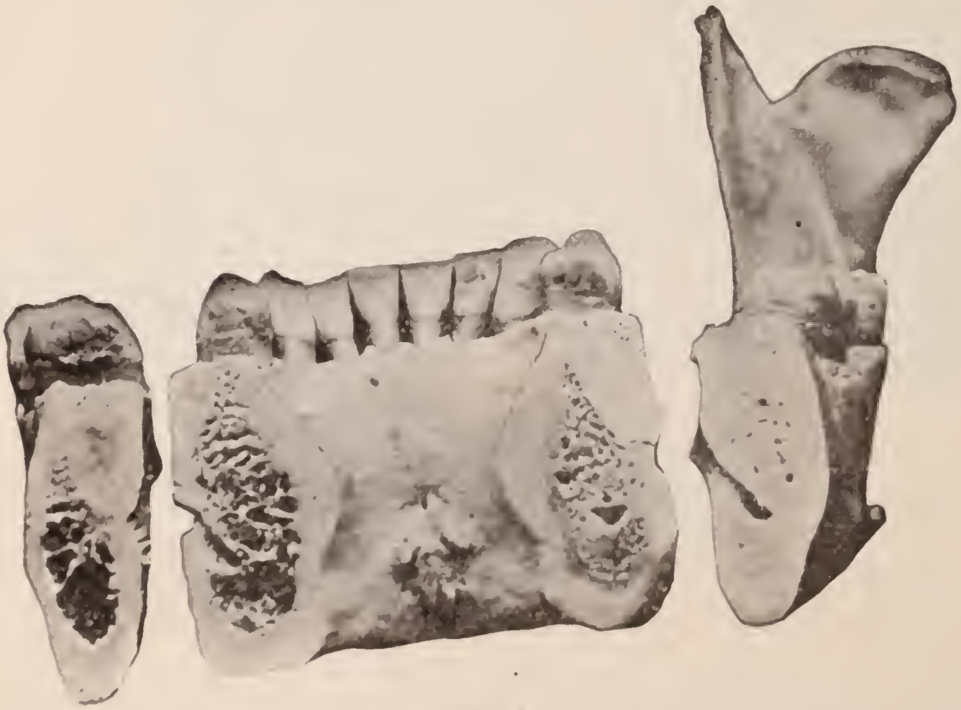

Fig. 6

*Teeth developing after the occurrence of these pathological conditions are liable to misplacement or impaction.*

Illustration No. 5 is made from the opposite side of the same mandible as the last illustration. The wall of the inferior dental tube is plainly seen, also the little canals passing to the roots of the teeth.

Illustration No. 6 is made from a transverse section of a cleaned mandible. The cut is made through the mental foramen on each side. On the left side the bone is in a normal condition, presenting the cortical U-shaped structures containing the cancellated tissue and the roots of the teeth. On the right side the cancellated tissue has become more dense and it has united with the cortical portion of the bone, so much so that there is no line of demarcation between them. One can imagine how very difficult it would be to extract teeth or correct irregularities in a jaw of this character. If this *condition had existed early in life, the forward movement of the teeth could not have occurred, and misplacement or impaction would have resulted, but it is probable that this condition was brought about by an infected first molar tooth.*

### SPREADING THE DENTAL ARCH

The orthodontist has become very efficient in correcting irregularities, usually by expanding the dental arch. There are differences of opinion as to the best method to be employed and also as to the manner in which this result is brought about. It is claimed by some that the arch is widened by opening the intermaxillary suture through lateral pressure applied to the teeth, but so far I have not seen any evidence to prove that this has been accomplished.

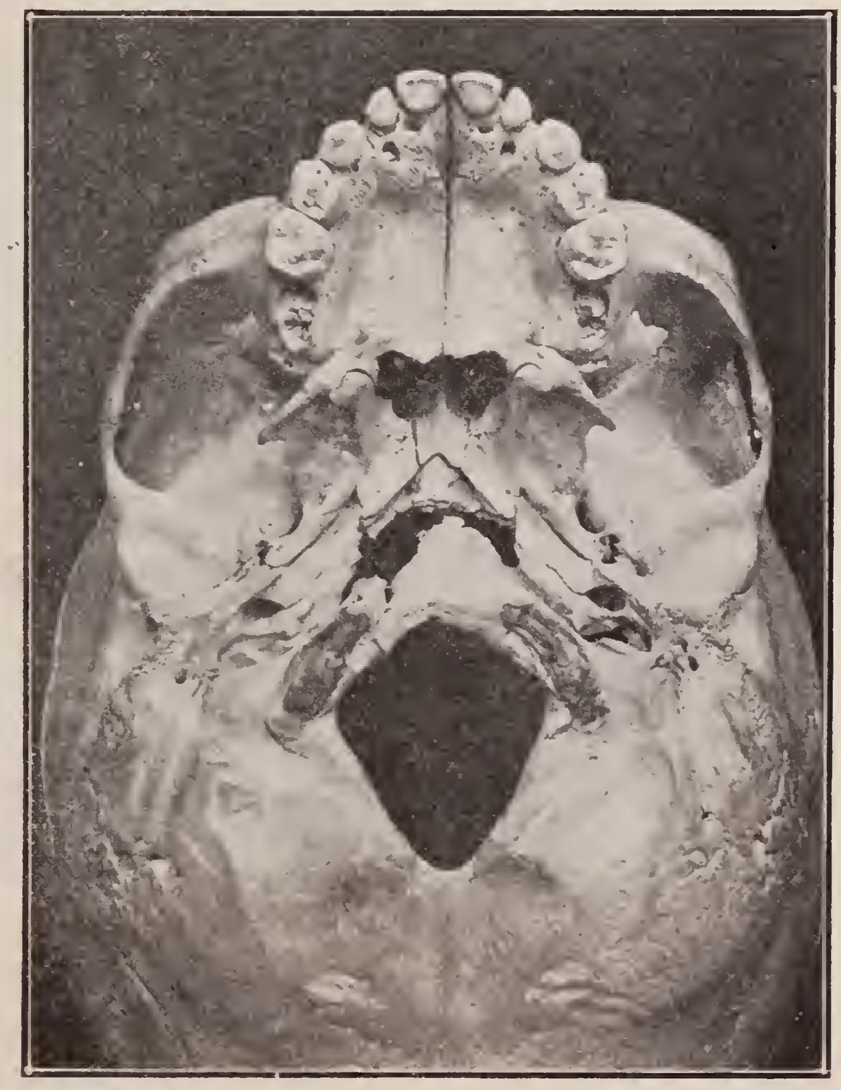

Fig. 7

Dr. Varney Barnes read an admirable paper at Cleveland last July upon this subject. He gave good evidence of having widened the suture between the premaxillary bones. The union of these bones is very slight, especially in childhood, and even in an aged skull the X-rays often give no evidence of interlacing fibers between the two bones.

Illustration No. 7 is made from a skull of a child of four or five years of age, showing the bones forming the roof of the mouth with the seven sutures between them. The median palatine suture passes from the free margin of the hard palate or the posterior nasal spine, between the two palate bones, where it is known as the interpalatal suture, then passing between the true maxillae, becoming the intermaxillary suture, thence forward between the premaxillary bones, when it is known as the interpremaxillary suture, the entire suture terminating at the anterior nasal spine.

This nomenclature of the various divisions of the median palatal suture is generally accepted by the American and English anatomists, and I believe it would be advisable if the orthodontists and the oral surgeons would also use it. In that way there would be a general understanding as to which part of the suture is meant when writing of this region.

By studying this illustration in conjunction with Fig. 1, one can see how easily the interpremaxillary suture could be widened, as there are no connective fibers, and there is little to hold the parts together. In the intermaxillary and the interpalatal suture, while there is only a slight bond of union between the bones, they are held firmly in apposition by the lateral bracing of other structures.

Many of the statements made in Dr. Barnes' paper on the preventive methods in impaction of teeth by widening the dental arch, etc., are well taken, but there are a few points brought out in his paper that need to be carefully considered. In the first place, spreading the dental arch by any mechanical means whatever must change the physiological conditions as well as the anatomical arrangement of the cancellated tissue of the alveolar process, and if done early in life the position of the developing permanent tooth organs may be disturbed in their relation to each other. This interference may cause a tooth to move in the wrong direction and thus become impacted or cause other teeth to become misplaced. If one will examine by means of the X-ray the position of the dental organs and the cancellated tissue of a child from three years of age up to the time of maturity, or examine the skulls as shown in Illustrations No. 2 and 3, one can appreciate how any meddlesome interfering with Nature can cause the misplacement of the permanent teeth. Teeth cannot be moved without bringing about physiological changes and causing more or less readjustment and possibly maladjustment of not only the bones, teeth and other tissues already formed, but also disturbing and displacing the angle of the teeth which are developing and which are about to erupt. *This disturbance may cause also over-deposit of lime salts, which will make the bone dense and unyielding,* as shown in the right side of Figure 6, so that it will resist the natural eruptive forces of the teeth, and they will be prevented from taking their proper places.

Teeth and tooth organs, as shown in Figs. 2 and 3, will assume their normal positions somewhat like those shown in Fig. 1 when not interfered with by constitutional diseases, decay, accident, or mechanical appliances. We know also that certain diseases cause impaction and that no spreading of the arch will prevent it.

Another point we must remember is that we have impacted teeth where the dental arches are of normal width, and even in unusually wide arches. I think in the great majority of the cases where there are impacted teeth, especially third molars, the jaws are usually of *about normal width.* The following illustrations will demonstrate this point:

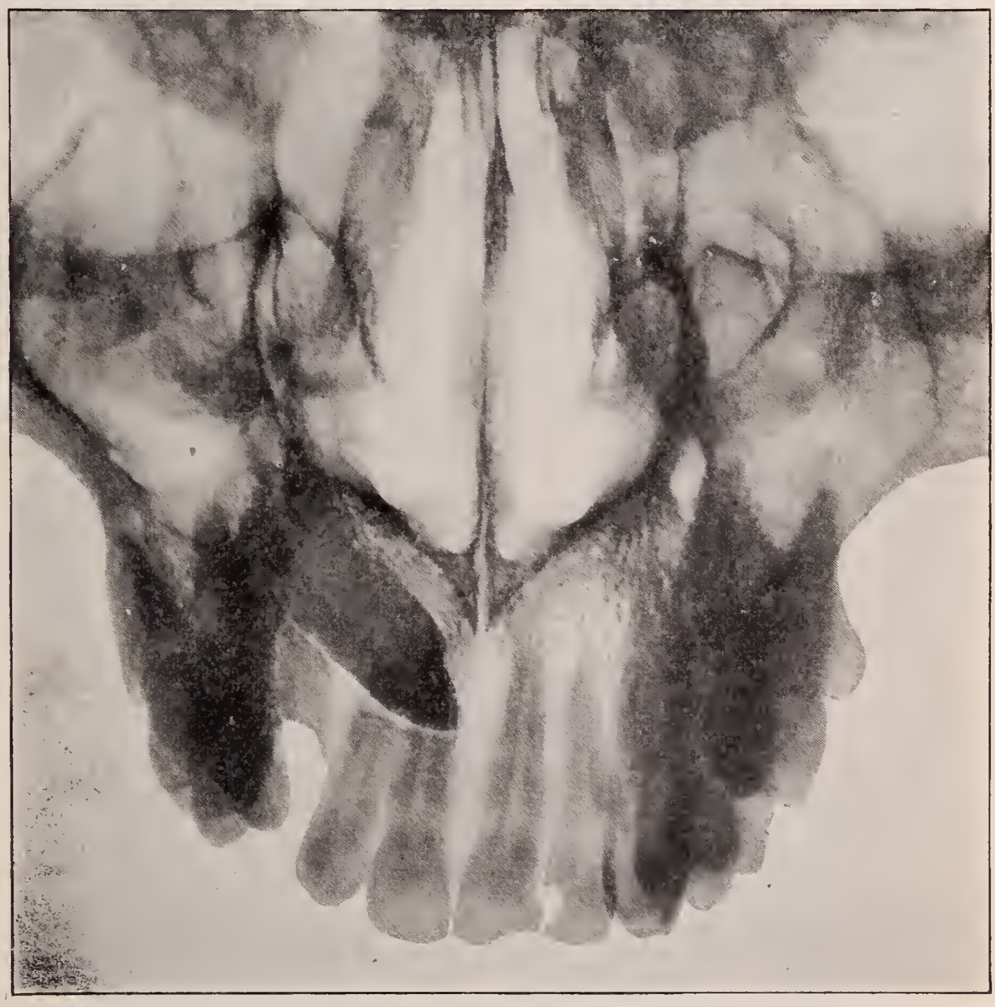

Fig. 8

Illustration No. 8 is from an X-ray picture of a skull that has an impacted canine. The arch, especially in the region of the first molars, is of normal width and the balance of the skull is typical with a straight septum. It will be noticed that the suture between the premaxillary bones is open, though I feel sure that no mechanical appliance has been used in this case.

This tooth should have come into position between the lateral and first premolar, or one might say near the suture between the maxilla and the premaxilla. It was not the narrowness of the arch in this case that caused the impaction, but some local disturbance before the time of eruption.

Illustration No. 9 is another impacted canine with a good arch, and showing an opening of the interpremaxillary suture. In fact, this open suture between the premaxillary bones is quite common throughout life, especially in that portion of the bone forming the alveolar process.

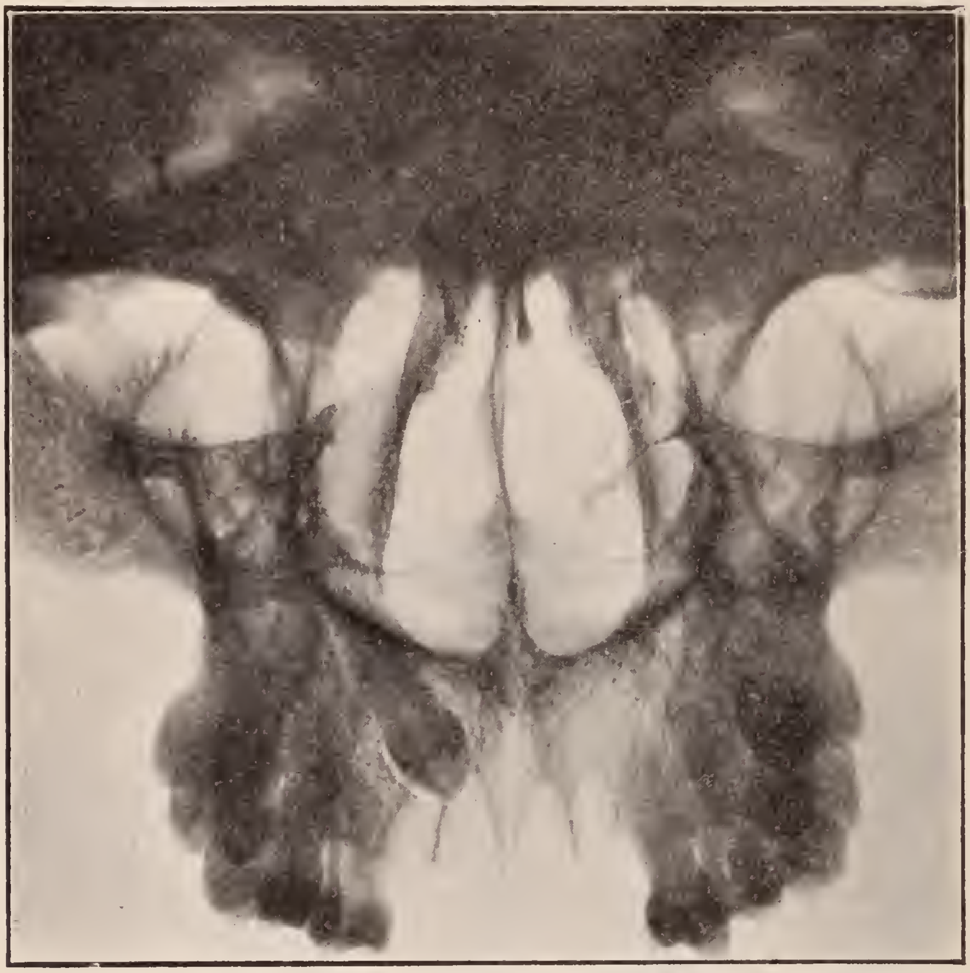

Fig. 9

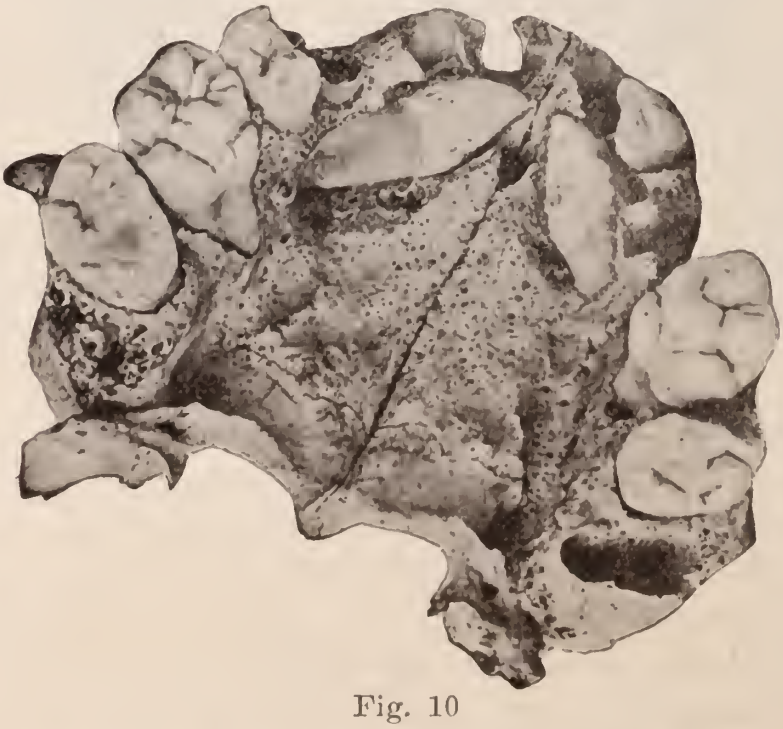

Fig. 10

Illustration No. 10 is from a photograph showing two impacted canines with a wide arch in the region of the molar and premolar teeth

Illustration No. 11 is an X-ray picture of a dental student; orthodontists agree that he has a normal arch, barring the impactions.

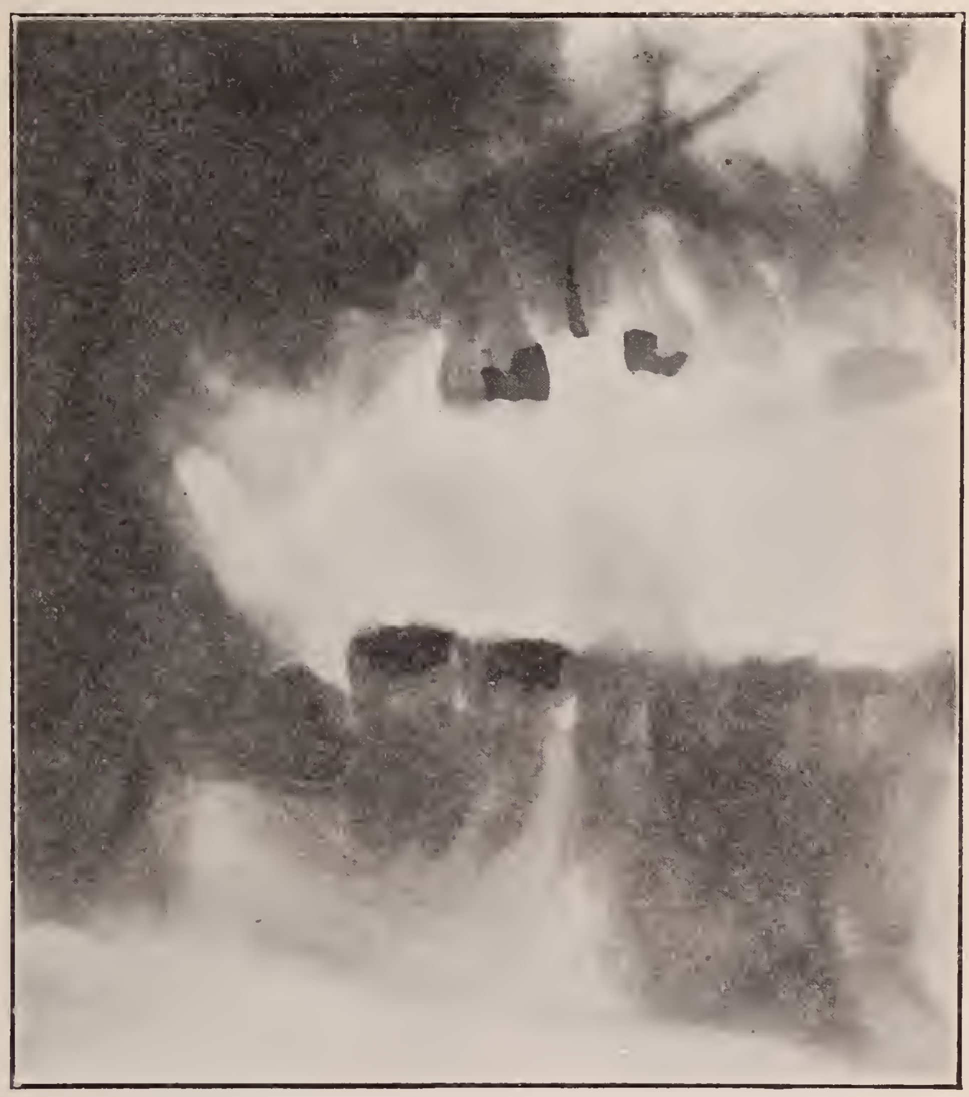

Fig. 11

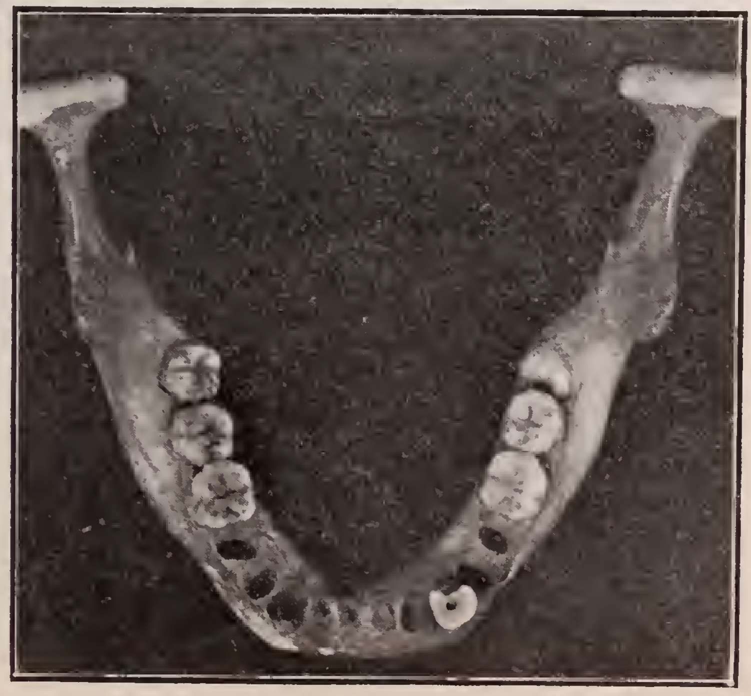

Fig. 12

Illustration No. 12 is from a photograph of a mandible of a *Chinese skull*, showing *impacted lower third molar*. The skull is normal in shape and the dental arches are of good width. No amount of spreading the arch would have brought this tooth into normal position.

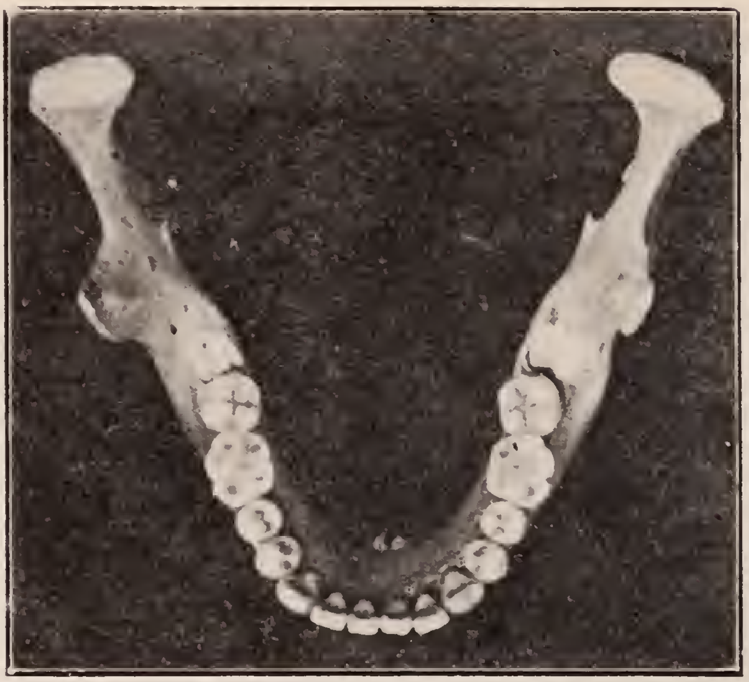

Fig. 13

Illustration No. 13 is from another mandible of a Caucasian, showing a pair of impacted lower third molars. This skull has well developed arches, etc.

The orthodontist of today is accomplishing great good in preventing impaction where there has been some local disturbance within the tissue of the jaws. I have many cases on record showing valuable results that they have obtained, and I will show a few slides which will demonstrate this point.

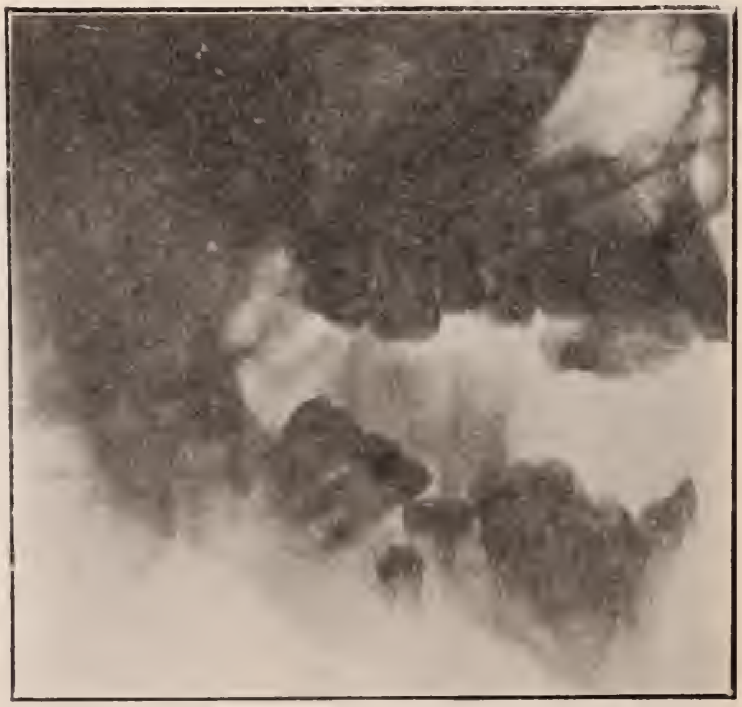

Fig. 14

Illustration No. 14 shows an impacted lower left second premolar. Extraction of the deciduous premolar and holding the space between the first premolar and the first molar allowed the impacted tooth to come into proper position.

Illustration No. 15 shows an impacted lower left first premolar. By slight spreading of the arch the tooth assumed its proper position. There is a question in some of these cases as to whether it would not be best to extract one of these premolars. Where all the other teeth are in good occlusion, and when making room for this impacted tooth would cause a readjustment of nearly all the other teeth, I would recommend the extraction of one of these teeth instead.

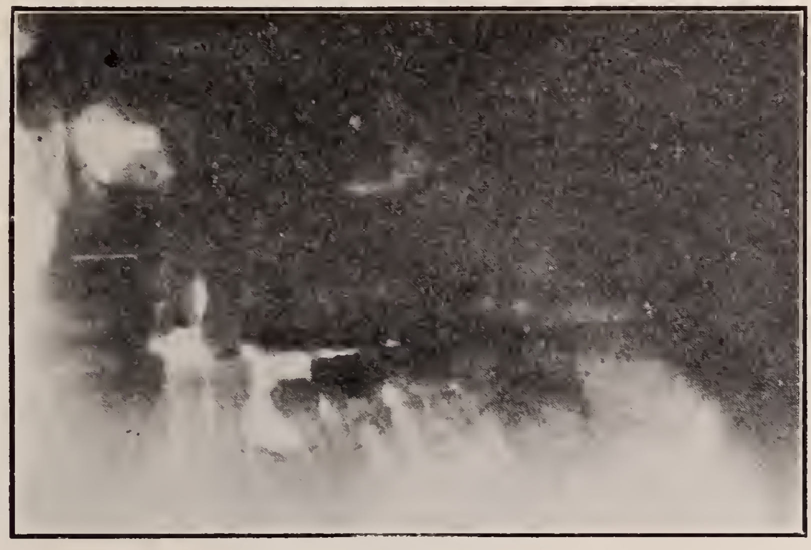

Fig. 15

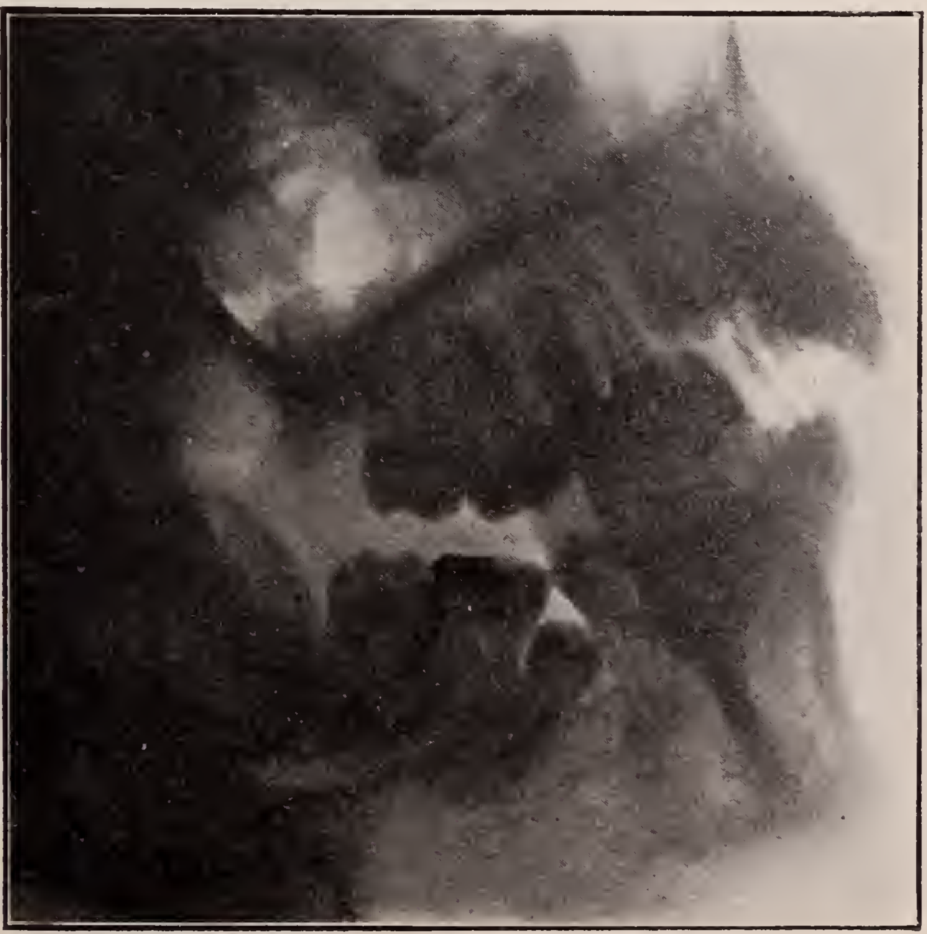

Fig. 16

Illustration No. 16 shows an impaction of a second premolar tooth. In this case it was necessary to force the anterior teeth forward to give this tooth room to erupt. The patient had a false occlusion, that is, the occluding line of the front teeth was far within its proper position. These teeth were forced forward, allowing the impacted tooth to take its normal position, and at the same time the occlusion was corrected.

While showing cases of impaction it may be interesting to show some very good illustrations which were used in a paper read before the British Dental Association last August and published in their journal and also in the *Dental Cosmos* for October, 1911.

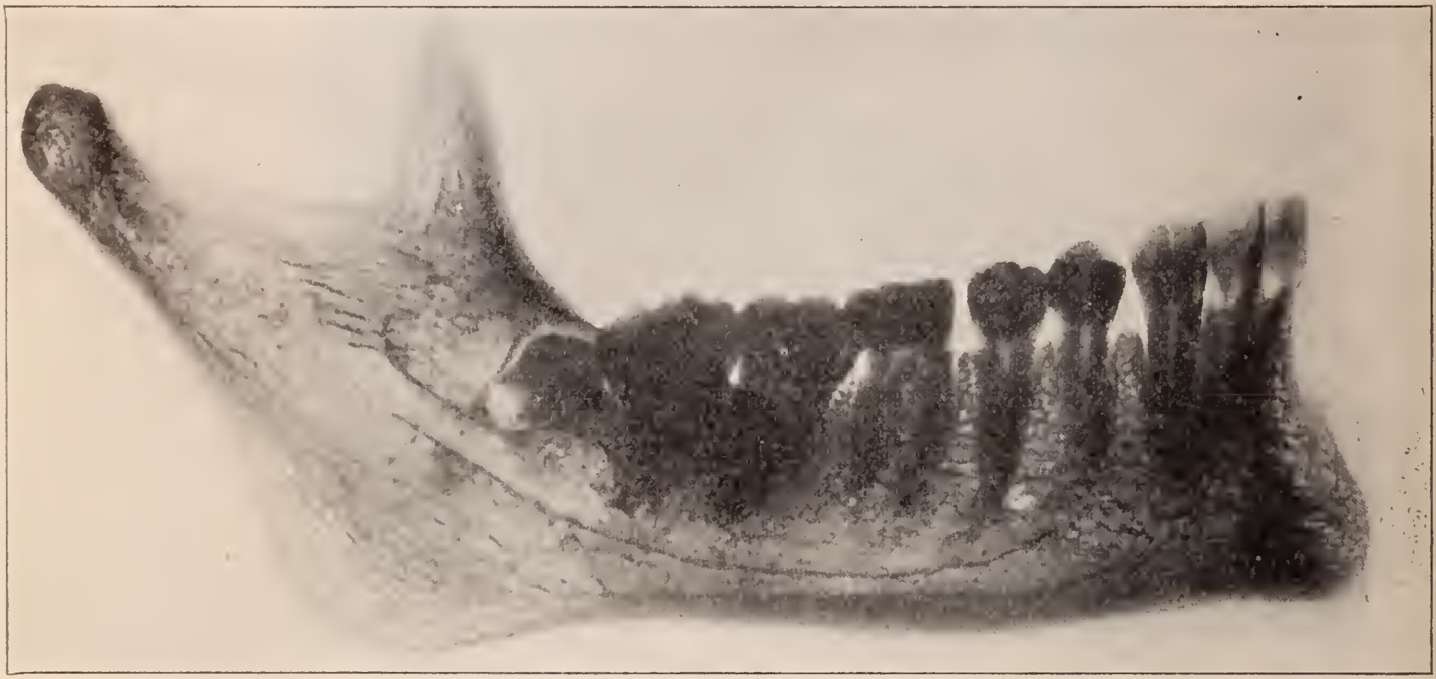

Fig. 17

Illustration No. 17 is made from the right half of the mandible. It shows distinctly the cancellated tissue of the jaw and the inferior dental tube (canal) extending from the inferior dental foramen to the region of the canine tooth. The mental foramen is shown between the roots of the

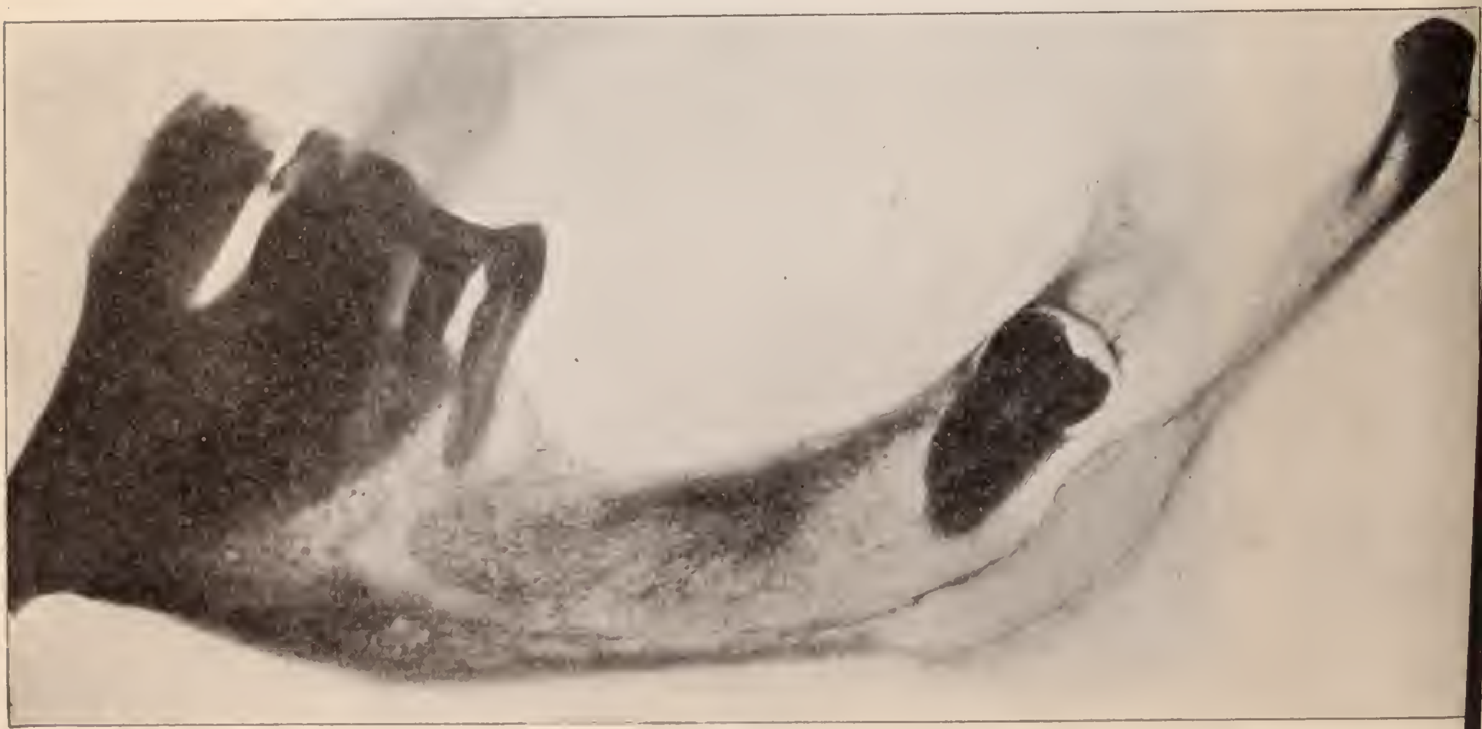

Fig. 18

first and second premolars. There is strong evidence that a pathological condition existed in the tissue surrounding the molar teeth, especially the second and third molars. The roots of these teeth also show similar evidence. It is possible that this condition was brought about by the presence of the rudimentary fourth molar shown in the picture.

Illustration No. 18 shows a molar tooth in the ramus of the mandible. There is a light area around the greater portion of the crown. Teeth in this position in the living subject often give considerable trouble and are very difficult to diagnose without the use of the X-ray.

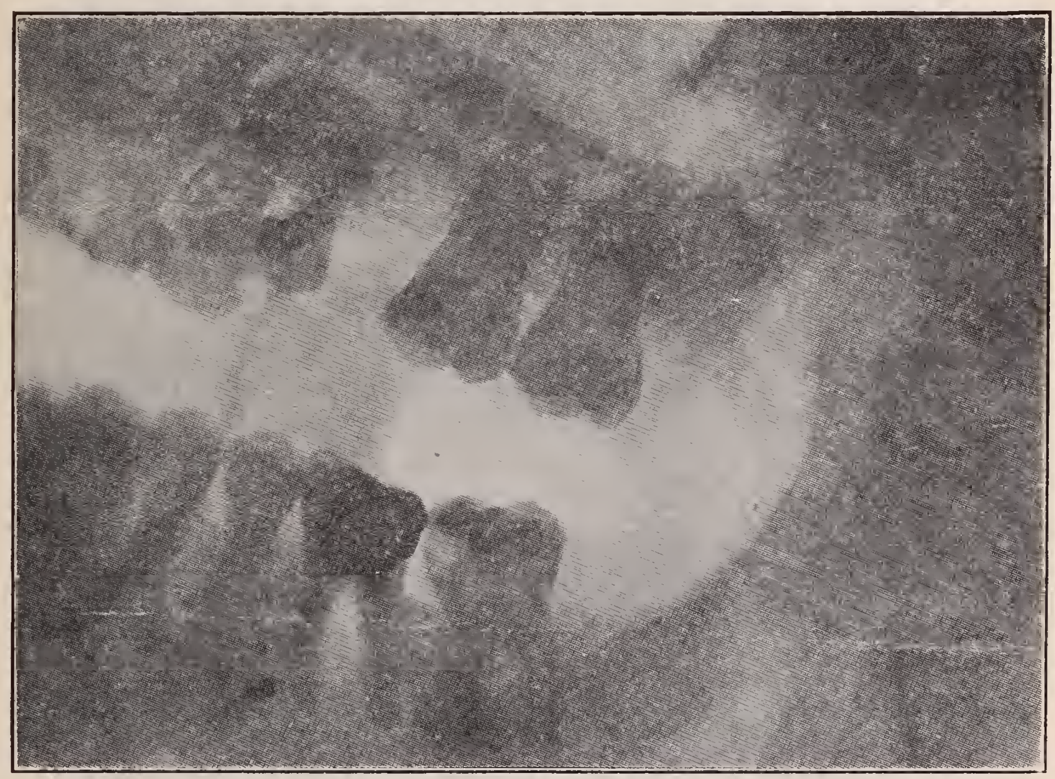

Fig. 19

Illustration No. 19 shows the occluding surface of the upper third molar pointing upward toward the posterior portion of the orbit. The patient had been suffering from a disturbance of the eye for a long time. Considerable improvement took place in the eye soon after the extraction of the inverted tooth.

It is often claimed that canals can be filled to the apex of the root of the tooth. These assertions were pretty safe until the X-ray came into use. Here we have an illustration of a failure; there has been an attempt to fill the roots of the first molar, but the picture shows how imperfectly the operation has been done, and many other illustrations of failure could be shown in the same way.

Illustration No. 20 is a lateral view made from a patient suffering from severe facial neuralgia and diseased maxillary sinus. Some years before the right upper first and second molar teeth had been removed, but without relief. The picture shows distinctly an impacted upper molar in the posterior wall of the maxillary sinus, with a light zone posteriorly to the tooth, indicating a change in the character of the bone. The distance between the occluding surface of the impacted tooth and the normal antagonizing tooth below is considerable. It was thought that the roots of the tooth

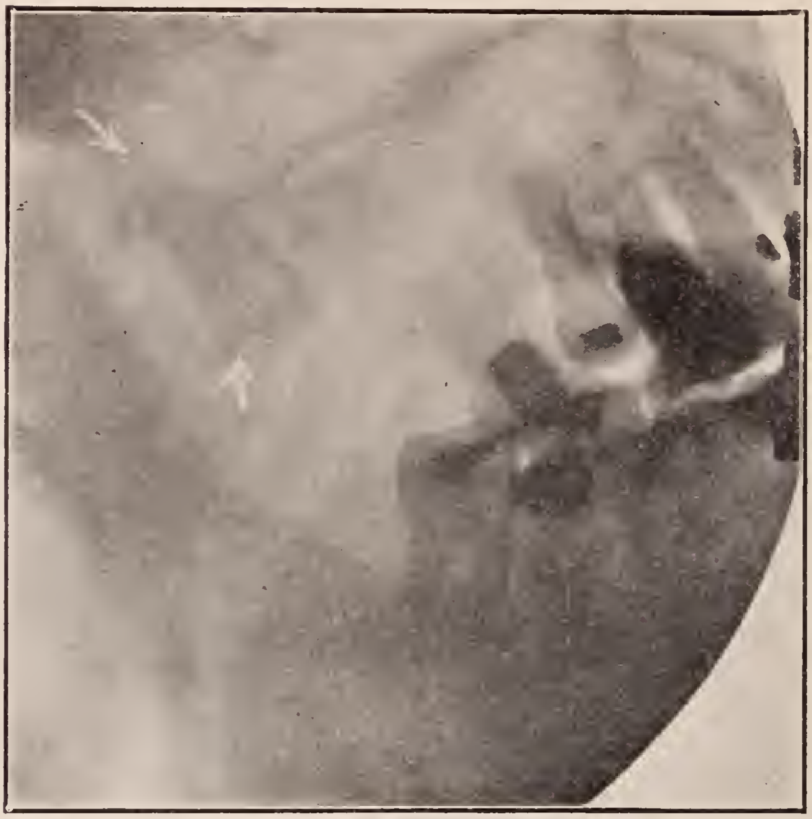

Fig. 20

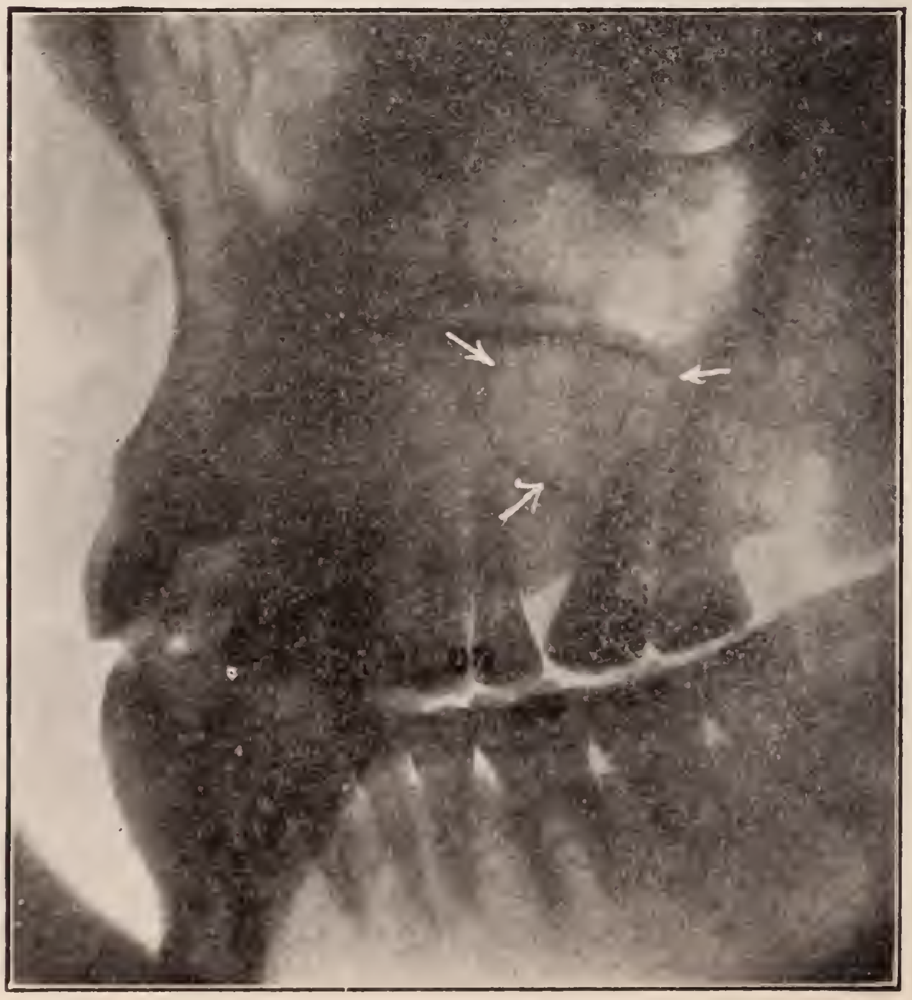

Fig. 21

were causing pressure upon the infra-orbital nerve as well as producing a diseased sinus. Removal of the tooth gave immediate relief.

Illustration No. 21. This picture is taken from a patient, a physician about forty years of age, who had pain in the left side of the face without any apparent cause. The radiograph was made and examined by several physicians, who feared that the enlargement of the maxillary sinus indicated a malignant growth in the sinus. The patient brought the X-ray plate to the writer, giving the history and the provisional diagnosis, and asked for an opinion as to the reading. It may be read as a malignant growth to those who do not know the history of the development of the sinus and of the teeth. The sinus is certainly large, especially in depth, but one who knows the development, growth and general anatomy of the teeth would recognize that this enlargement of the sinus must have taken place before the growth and formation of the roots of the second and third molars. A malignant growth of so many years' duration would be extremely uncommon and should not be accepted without further evidence. If there has been no pathological or mechanical interference, such as an early enlargement of the sinus, the roots of these teeth would have been in the walls of the sinus and spread well apart. The unpleasant sensation in this region was caused by the nerves with compressed roots being impinged

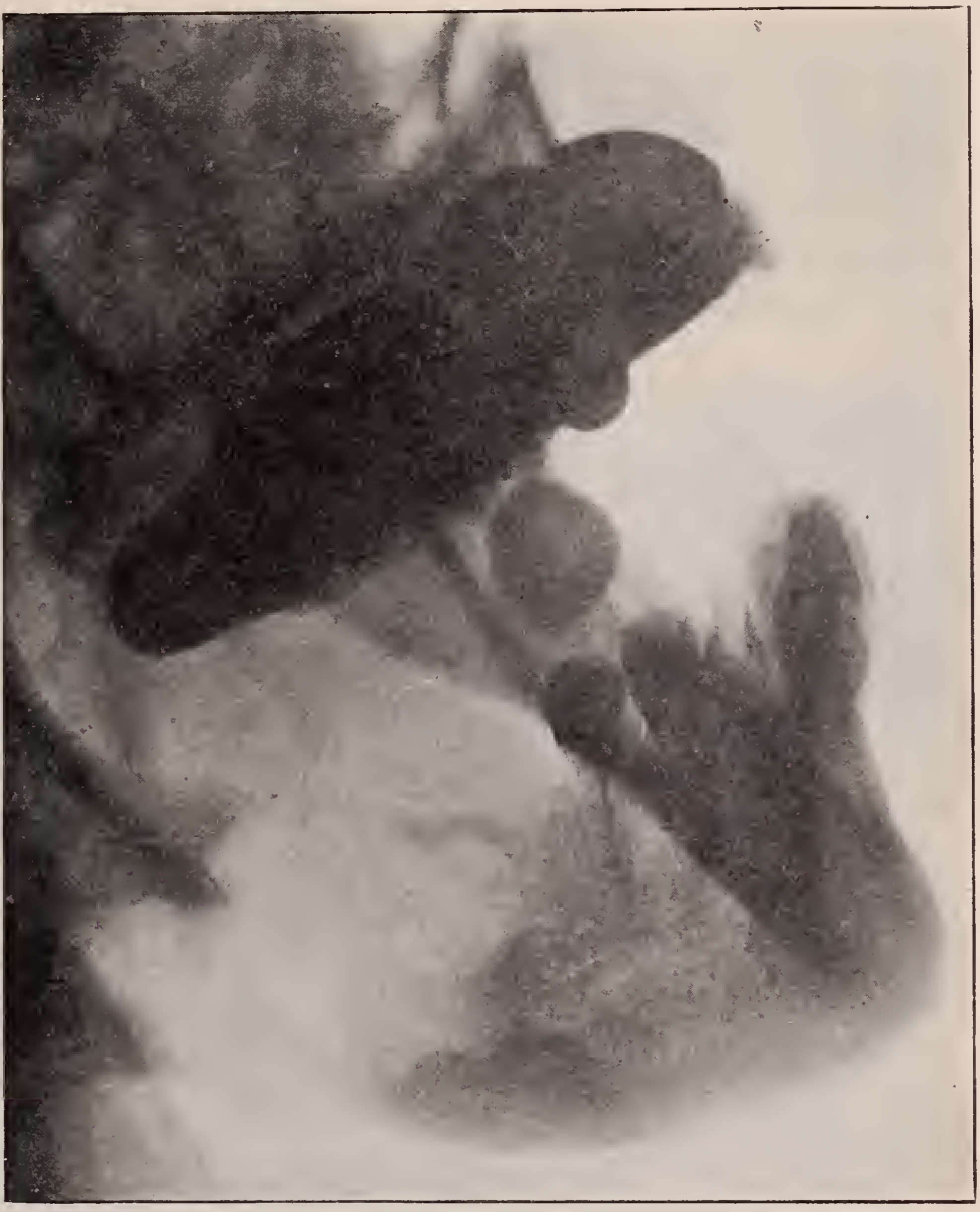

Fig. 22

upon the surrounding dentine. The removal of the teeth cleared up the disagreeable disturbance of the face. A slight opening was made into the antrum in order to explore it and to demonstrate that there was no disease present in it.

The next two illustrations are extremely interesting from several points of view. The two patients were sent by different practitioners from different portions of the State of Pennsylvania, but came for examination on the same day. They were two women of about the same age, both wearing full upper artificial dentures and partial lower ones, and both suffering from a similar character of pain, the only difference being that in one patient the pain was located on the left side of the lower jaw, while in the other it was on the right side of the lower jaw. Physical examination only revealed the fact that the right cervical lymphatic glands in one of the patients were slightly enlarged. The history obtained of the cases did not assist the diagnosis. Both patients claimed that the molar teeth on each side had been extracted years ago. X-ray pictures were made of the jaws, with the following results:

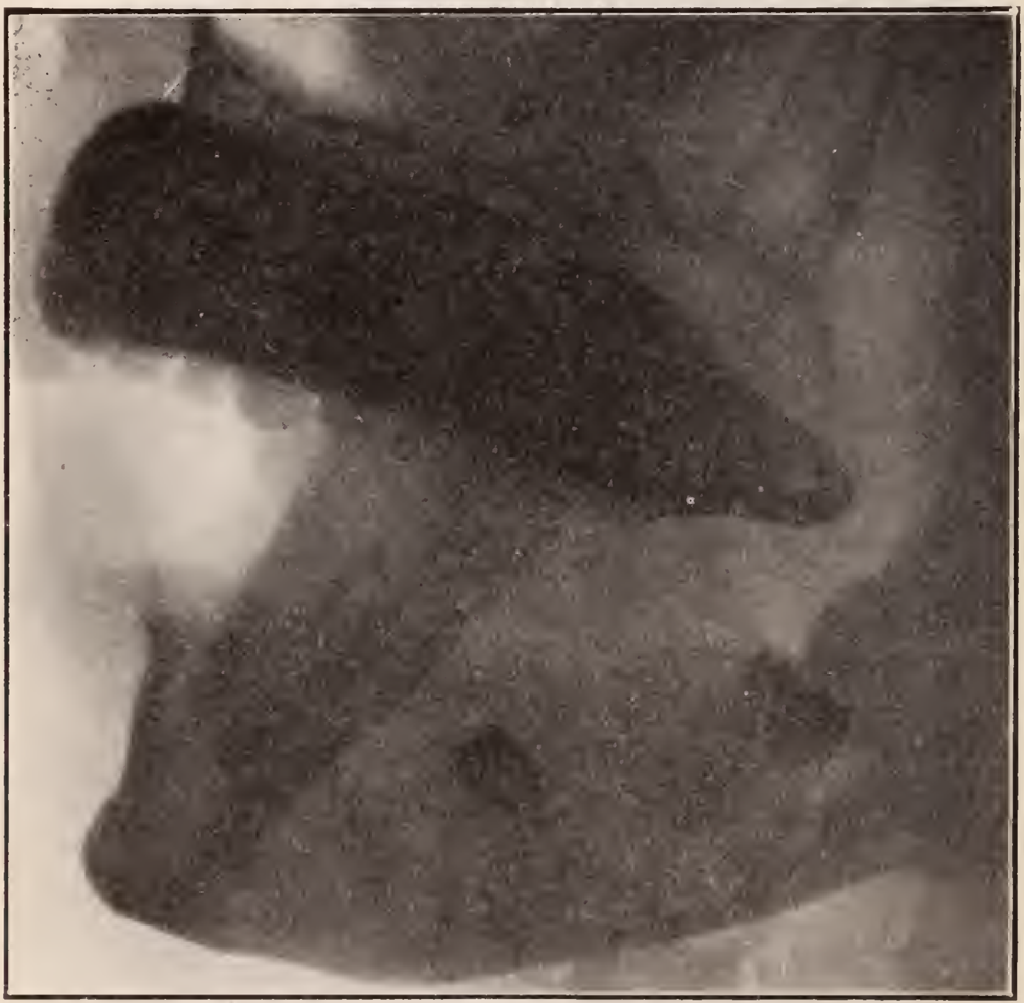

Fig. 23

Illustration No. 22 was made from the patient whose cervical glands were slightly enlarged. The picture shows a breaking down of the bone with a few dark shadows, indicating abnormal density of some portions. From this appearance, together with the slight enlargement of the glands, the case was diagnosed as myclosarcoma. A microscopic examination of the tissue removed confirmed the diagnosis.

Illustration No. 23 was made from the other patient. It shows definite cause for her trouble, for it shows three lower impacted teeth, one a rudimentary premolar or bicuspid, while the other two were very likely the second and third molars.

There seemed to be very little difference in these two cases from the history and physical examinations, but the wonderful work of the X-ray revealed a great dissimilarity. On the one hand the skiagraph indicated the sad necessity of removing the entire right side of the jaw and submaxillary lymphatic glands, with a possibility of the disease returning; while in the other case the extraction of three impacted teeth was the only thing required.

### DISCUSSION

J. F. BIDDLE, D.D.S., Pittsburg, Pa.: I have had the pleasure, on several occasions, of listening to papers presented by Dr. Cryer and have read, as well, a number of his articles, and always with the feeling that here is a man whose specialty has not warped his judgment, destroyed his love of his profession, nor conquered a sincere desire to be helpful to his fellow practitioners.

As the doctor has remarked, Dentistry is, above all, a progressive science. This is especially true in the field of Orthodontia, where the results in the past ten years have been simply marvelous. The term Orthodontia has long since broadened into more than the name implies, as the Orthodontist of today no longer corrects the dental arch alignment and occlusion only, but endeavors also to correct facial deformities through the medium of force applied to the teeth. This operation requires a thorough knowledge of the bony structure of the head and face, particularly of the mandible and maxillae. For example, when one knows that the cortical plates of these bones vary in thickness, depending upon the stress sustained and that the direction and arrangement of the cancellated plates is determined by the force received upon the Cortical plates, is one not better able to construct and adjust appliances that will accomplish the desired results with the greatest degree of accuracy?

I agree with the essayist, that the Orthodontists who obtain the best results do not necessarily belong to the old school or the new, but are broad-minded men, who, having made a study of the anatomical structure of the face, together with its physiological and pathological bearings, set about correcting existing irregularities in a thoughtful and intelligent manner, with due consideration for the patient's comfort, convenience, and general health. This is true, in a general way, not only of Orthodontia, but in every branch of dental science. It is, of course, not as vital to the immediate life of the patient that the general practitioner be as thoroughly versed in anatomy, physiology, pathology, and histology of the head as the oral surgeon, but equally essential to the life of the teeth and the general health of the patient. Each filling, crown, bridge, plate, retention or extraction of a tooth should be undertaken only after careful consideration of its value in relation to the hard and soft structures of the mouth and face. The demand, opportunity, and recognition of broad-minded, intelligent operators in the field of dentistry has never been so great as at the present time.

Dr. Cryer has cited an instance of a prominent teacher of Orthodontia in this country usually showing a prognathous negro skull as a model for his pupils to follow in the correction of alignment and occlusion and that the result is shown in some of their patients. I have heard some prominent orthodontists state that if normal occlusion be restored the facial outline will take care of itself. The fallacy of this statement is obvious. Personally, I should not feel I had secured normal occlusion unless the relation of the teeth and connecting bones were such as to be in harmony with the hard and soft tissues of the associate parts of the face and head. Another point of vital importance to the Orthodontist is the ability to recognize the proper time for the beginning or the deferring of the movement of the teeth, as the case may be. Many times young children with erupting teeth, apparently out of alignment, are brought to the dentist for attention. In many cases such teeth would take their proper position if Nature were but given a chance, but some zealous fellow indulges his imagination on what is going to happen, with the result that appliances are placed on cases that would have undoubtedly taken care of themselves. On the other hand, many dentists will advise waiting when the case is an ideal one for orthodontic interference. These conditions can be obviated only by a thorough and careful knowledge of the normal functions and growth of the teeth, of the maxillary bones and of the surrounding hard and soft tissues.

When the perfect filling of root canals is mentioned, I am reminded of what one of our professors said to us students in college days: ''Gentlemen, when the patient feels pressure at the end of the root, you may know your operation is successful.'' For a number of years I was happy in my ignorance, then began experimenting in X-ray, and my illusions vanished. Had a little experience with such fillings in my own mouth. The roots of a lower molar were opened to the end with reamers, when gutta-percha points were inserted. I was absolutely certain that I had felt them penetrate the tissues at the apex. Much to my surprise, as well as that of the operator, the radiograph revealed the fact that they lacked one-eighth inch of this point, the sensation I had experienced due, no doubt, to air pressure. On the other hand, it is possible for one, in his zeal, to fill beyond the apex and thus cause trouble, as the following case illustrates: Two years ago a young lady, having severe pain in the upper left maxillary region, due, according to diagnosis of three physicians and one dentist, to a nervous disorder, came to Dr. Zugsmith for treatment. She was in a highly nervous condition. Dr. Zugsmith examined her teeth thoroughly by all known tests for teeth disorders but could find no indication of such, and as a last resort advised that an X-ray be taken. The radiograph revealed gutta-percha root filling in the first permanent molar, so imperfectly inserted that in the lingual root it extended about one-sixteenth inch beyond the apex; also, an incipient abscess on the cuspid. Even after these conditions were discovered we could locate no external manifestation that would lead us to diagnose the trouble as due to these teeth. However, the cuspid was opened and the root filling was removed from the molar, with the result that the patient obtained immediate relief. The teeth were treated and refilled nearly two years ago and the doctor advised me last week that there had been no recurrence of the trouble.

In connection with the X-ray in Orthodontia it has been found unwise to extract a deciduous tooth which has been retained beyond its normal time, for the reason that quite often the permanent tooth may not be present. I cite one instance, that of a man thirty years of age, who had a permanent cuspid on the left side and a deciduous one, with a badly broken-down crown, on the right side. The radiograph showed that the permanent cuspid was not present. Instead of extraction and subsequent mutilation of the good teeth on either side for a bridge, the deciduous cuspid was crowned with satisfactory results. The same week I radiographed the maxillae in the cuspid region of a girl of fifteen with a deciduous cuspid containing mesial and distal approximal cavities and with no indication of the permanent tooth, while on the other side was the permanent cuspid. The radiograph revealed the impacted tooth. The deciduous tooth was removed, a vertical slit about one-half inch long was made in the soft tissue to the lingual side of the lateral incisor and held back with a gum retractor, while a small amount of bone was chiseled away, exposing the lingual surface of the cuspid tooth. A small cavity was made with a No. 4 round bur and undercut with a No. 37 inverted cone bur, a pin was bent in the form of a staple with the head fitting into the cavity and the excess cut off. The staple was then cemented to place and this attached to an arch by means of a rubber band. When the tooth had moved down sufficiently to be banded it was attached to a resilient arch which brought it into an alignment as perfect as the other permanent cuspid. I could cite a number of instances of both extremes, all of which go to prove that a deciduous tooth should never be removed unless there be absolute proof that the permanent tooth be present in the jaw. My experience has been that it is never permissible to extract any of the six anterior teeth to correct a threatened or actual irregularity of the other teeth, or deformity of the facial outline. There are cases where it is advisable to extract a bicuspid on each side, or on one side, to correct dento-facial irregularities. However, these are not common, and it should never be done except as a last resort. When in doubt, do not extract.

Dr. Cryer cited a number of instances of pathological conditions which he had diagnosed accurately by means of the X-ray. How could he have done this had he not had a thorough knowledge of normal, physiological structure? The X-ray is conceded the most important aid to diagnosis in general surgery, and in the hands of certain classes of dental operators is of equal importance. I believe the time is coming when it will be criminal negligence to consider treatment of any pathological disorders involving the internal hard and soft structures of the mouth without having first an X-ray examination. If we secure proper radiographs, however, and are unfamiliar with the normal internal structures, they are worthless; therefore, a painstaking study of the anatomy, physiology and histology of the head and face should receive the most careful attention from the general practitioner as well as from the specialist. Remember, ''knowledge is power.''

L. G. SINGLETON, D.D.S.: I asked Dr. Cryer if, in the discussion of his paper, he merely desired an administration of salve, but he assured me that he welcomed constitutional treatment up to the physiological limit. But I may need police protection before I get through.

Having been assigned the privilege of discussing the paper of the afternoon, it is with regret that I am able in such small measure to patronize the views of the essayist.

While subjects pertaining to Orthodontia have been injected into, and constitute a major portion of the paper, I am not persuaded that the presentation thereof, in any particular manner, commands the interest of Orthodontists except the questions regarding the maxillary end.

It is with some difficulty that I am convinced that Dr. Cryer really expects his hearers to take his paper seriously. I am rather persuaded that the text is merely a vehicle for the exploitation of the illustrations, than that the illustrations were intended to emphasize the text.

In the face of the vast amount of literature bearing upon many of the features submitted, it would appear superfluous to further refute their value at this time, but as their presentation by a distinguished member of the profession cannot but be distinctly detrimental to the general practitioner's understanding of the real principles of Orthodontia, and while I appreciate my utter incompetency to cope with the situation, I feel that some qualifying observations should be made.

In the first place, I am confronted by an interchangeability of terms and phrases which sends me floundering for the real meaning and intent. If he means what he says, I don't agree with him. If he doesn't mean what he says, I don't agree with him.

In referring to illustration No. 2, of child's skull of about six years of age, if he means these teeth *will assume* their normal position for each day of the life of the patient up to maturity, *without mechanical interference,* he abrogates the necessity of function. The exercise of function is a prime requisite for any organism to attain maturity. Function stimulates the expression of hereditary characteristics. ''Every cell increases; every organ augments, and every function expands proportionately to its activity.''—(Selected.) The teeth meet with resistance from the moment they peek through the gums. By the simple act of mastication they come within the sphere of popular mechanics, by the impact of food upon and about their surfaces, through the influence of the *leverage* of the jaws.

Then, in conformity with their growth force as they approach and come into contact with their antagonists of the opposing jaw, a combat of inclined planes takes place, which results in their becoming firmly locked in each other's embrace. And an inclined plane has no mean rating as a mechanical power.

If he means that Orthodontic treatment is mechanical interference, then he implies that such teeth could not take their normal position had such treatment intervened; for he says ''if no mechanical interference takes place, these teeth will assume their normal positions,'' etc. His view is further supplemented by his reference to illustration No. 1 (Dr. Angle's model, so-called), when he says: ''I feel confident that no mechanical appliance has been used to bring these teeth into their beautiful alignment and occlusion.'' In other words, this injudicious mechanical interference (and orthodontic treatment is presumed to be judicious), *prevents* teeth assuming a perfect and normal position, while mechanical appliances, injudiciously applied, are the inspiration for the popular cartoon of the day, and the orthodontist had better look out for his laurels.

The orthodontist is enjoined to ''remember that the tooth germs and the teeth *change position* from the time they commence to develop until they are lost, the greatest rapidity of change usually taking place before maturity.'' From the extracting specialist's point of view, in many cases, the greatest rapidity of change of position is just at the *time* they are *lost*.

With regard to the statement that ''every tooth has a normal position, changing from day to day, and if the orthodontist carries the tooth out of that position he is producing an *abnormality*.'' Supposing the orthodontist *should* move a tooth a few days ahead of its time, for any particular position and purpose, would it still be an abnormality in case he held it there until it caught up with its schedule and purpose? In the child's skull, the crowns of the developing permanent teeth were said to be in their *normal positions* for this age. These teeth may be and may not be developing normally, and may be and may not be in characteristic positions; but I fail to see how anyone is able to state absolutely that a tooth, while within its crypt, has assumed, or will assume, or is in its normal position for any age, until it has emerged and taken its place in occlusion. Occlusion is the dentist's guide, and normal occlusion is the orthodontist's ideal.

Dr. Cryer begs not to be misunderstood, and likewise the orthodontist prays not to be misrepresented.

This contribution to the discussion thus far has been delivered with the distinct idea of conveying to your minds that the essayist has not been guarded in his statements, awakening the presumption that other statements are no less open to censorship. But as the time permitted limits the scope of this discussion, the many points open to argument can only be covered by generalization, with the intent of creating in your minds a more favorable impression with regard to the real spirit of orthodontia than has been manifested by the essayist.

As long as man has existed as a separate species in the zoological kingdom, which comprises a period of untold thousands of years, his typical dentition has been retained as a most persistent and dominant characteristic. The evolution of tooth forms has been traced from the simple cone of the fishes, through the cone with accessory capsules, into the cone with two lateral accessory cones, passing to the triangular crown with three main cusps, on up the line to the tritubercular and quadritubercular teeth of primates, including man.

With conditions conceivably quite as propitious for change in form and position, during the long ages of the past as at the present time, the teeth and jaws of man have retained their typical characteristics. Having this thought in mind, we should be able to fortify ourselves against the notion that any radical changes of the typical characteristics have even the remotest possibility of taking place, including form, position and number of teeth during this or any immediate succeeding generation of the species.

We are what we are as the result of the processes of evolution, which appear, in man, to have reached a condition of organic stability. Along with other characteristics impressed upon the germ cell for each individual are the potentialities for the development of the fifty-two teeth in typical arrangement. The teeth are an expression of our ancestral inheritance. For the fullest realization of this inheritance, we are dependent upon many and varied external developmental stimuli. Without appropriate environmental conditions, during the formation period, the inheritance may fail to realize itself in development. Thus, in a general way, we may dispose of the causes of irregularities of the teeth which are, in form and position, at variance with the type of the species (including impactions as well), as due to the absence of appropriate environmental conditions and developmental stimuli.

The function, therefore, of the orthodontist, and likewise the aim of the idealist is not merely tooth alignment or the construction of sanitary appliances, not the reversal or obstruction of Nature's processes, not the creation or mutilation of types, but the endeavor to realize the purest expression of the inheritance in the individual.

Dr. Angle has advocated the principles of normal occlusion as a basis for the attainment of this goal, because this standard enjoys the distinction of having been universally incorporated as a part of the architectural design in the creation of species. Angle does not exhibit skulls "as a model for his pupils to follow in the correction of alignment and occlusion." The absurd fallacy of such a procedure is only too evident from the essayist's presentation of his "ideal model for the orthodontist to have before him when correcting irregularities" (Illustration No. 1), where the total inadequateness is manifested by his own words before the completion of his sentence.

### BONE TISSUE

I have no conception of bone tissue as being possessed of characteristics opposed to life's activities, unless it be dead bone. I cannot comprehend how a tooth, or any other substance, can be forced through bone, much as a snowplow through a drift, without the advantage of an opening. I cannot understand how bone can become so stubbornly compact by the deposition of lime salts that it is capable of preventing the eruption of a tooth, which is possessed of normal growth force, unless that force is *exhausted* in driving the tooth in a direction away from its indicated point of eruption (in a horizontal direction, for instance), or the presence of teeth or foreign bodies in its path. Nor, from the very nature of bone, can I imagine a tooth as if mechanically riveted to the cortical plate in a manner capable of resisting all endeavor to move it.

A conception of bone tissue is that it is swarming with living cells, constantly active, readjusting its structure in response to requirements of mechanical (muscular) stress, being built on when too thin, cut away when too thick. That teeth change position, or erupt through its surface, by virtue of its structural readjustment due to activity of bone cells. I can imagine how, through the influence of some pathological condition, the potentialities of the bone cells should become perverted at a time when they should be functionally active and thus become a predisposing cause of impactions, but this is aside from the density or impracticability of bone as a factor.

The idea of teeth moving within the U-shaped cortical bone like balls in a bowling alley and that this procedure induces, or is in any way the cause of the curvature of roots, is equally untenable. If this is the cause of distal curvature in the apical third, how are we to account for the general forward direction in the gingival third, which is equally concerned in the push? How are we to comprehend the divergency in molar roots, one mesially, one distally, and another lingually, in three diametrically opposed directions, followed by convergency? It is incomprehensible that the tooth was susceptible of movement in three directions at the same time.

If such a view were conceivable we should be able to demonstrate, by aid of the skiagraph, all sorts of fantastic curves and spirals, induced by orthodontic treatment. and measure the force necessary to produce any kind of a kink.

Another objection to the curvature hypothesis is the fact that the tooth is calcified within its crypt, surrounded by the same protective agencies as the follicle itself, and its contact with bone is subsequent to the formation of its fang. For if the follicle were subject to impingement from lateral stress, due to growth force, we would have to record all manner of distorted crowns as a resultant corrollary. It would be just as reasonable to state that the divergency of the superior molar roots was induced by air pressure within the maxillary sinus.

Without dwelling upon the subject of evolution, or the various agencies by which it is operative, I would suggest, as previously stated, that the shapes of crowns of teeth, as well as their roots, are a continuation of characteristics, which are a part of the heritage of the species, and are generated in conformity with the laws of heredity. The course of development pursues characteristic pathways, but its full realization is susceptible of interruption and perversion. And, either in its perfection or its deviation, its course comes fully within the bounds of natural laws.

And herein lies the value of orthodontic procedure. Not that we shall stand idly by, countenancing perverted efforts of growth, expecting later on to step in and induce Nature to reverse her course. The astounding folly of such an attitude is only too evident by her persistent refusal.

Rather should we fortify ourselves by familiarity with the architectural design, anticipate its requirements, and superintend the construction as indicated, in conformity with natural laws. Then only shall the structure be in full accord with the design. Then asymmetry shall give place to symmetry, and harmony and balance shall rule supreme.

Dr. G. F. Bowman: I do not remember listening to a paper which offered such a possibility for discussion as the present one, but time prohibits anything like a thorough consideration of the various questions touched on by the essayist. There are, however, one or two points which I am unwilling to pass by, the first being Illustration No. 1½, which the essayist shows and of which he says, ''One of the prominent teachers of orthodontia in this country usually shows a prognathous negro skull as a model for his pupils to follow in the correction of alignment and occlusion, and the result is shown in some of their patients.''

For a number of years Dr. Cryer has been fond of making this and similar statements, and I submit nothing could be more unfair if he, as seems entirely probable, means Dr. Angle. For Dr. Angle does not use a negroid type for his pupils to follow any more than he uses a Greek, a Roman or a Semitic type; on the contrary, Dr. Angle teaches and has taught for years that there is but one guide for the orthodontist, and that is normal occlusion.

That there may be no misunderstanding, let me quote a few passages from his seventh edition. He defines ''the line of occlusion as being the line with which, in form and position according to type, the teeth must be in harmony if in normal occlusion''; note he says, according to type. Again he points out ''no two human dentures have ever been created that were exactly alike, in the position of the denture as a whole in its relation to the SKULL, in the angles of inclination of the incisors as well as the other teeth, in the sizes and typal patterns of the teeth, in the length of the cusps and consequent overbite of the incisors, in the sizes, widths and curves of the arches'' they all differ. Moreover, he specifically states ''that no lines or rules for measurement of the human face admits of anything like universal application,'' and insists that balance and symmetry are the only factors to be considered in judging the art requirement of a given face, and surely even Dr. Cryer will hardly contend that Dr. Angle is so lacking in appreciation of facial balance as to wish to put a negro's jaws in a Caucasian face. Dr. Angle has reiterated again and again that type, and type alone, must govern the relation of the arches to the skull, and has protested against the too common assumption of the orthodontist that he is justified in changing the typal requirements of the face by extraction. If, as the essayist claims, some of Dr. Angle's students are developing prognathous jaws in faces when they are contrary to type, it is in spite of rather than because of his teachings.

It would be possible to go on for some time quoting, but enough has been said to show how unjust is the essayist's charge.

To take up another phase of the paper, I cannot conceive of any justification for ''spreading the arches'' if the ''conditions are physiological,'' and it is precisely because we are convinced they are not physiological and it is our desire to make them so that we do interfere. It is a safe assumption that we only have malocclusion through some departure from normal developmental environment, or, to put it another way, given a normal child at birth and raised under normal developmental environment, we would not have malocclusion, but, on the contrary, normal occlusion.

We believe that one of the most necessary factors in the developmental environment of bone, the jaws included, is mechanical stimuli, and the one thing that most nearly furnishes this stimuli is use; unfortunately, under modern civilized life, everything else may be favorable to the child's development, but the mechanical stimuli necessary to a proper development of the jaws is absent owing to our perverted food habits, and the jaws and teeth, which Nature intended should be developed by crushing and tearing food, in a very large degree miss this stimulation, hence many of our cases of malocclusion.

It is the province of the modern orthodontist to furnish, artificially, this mechanical stimuli of which environment has robbed the child; not, however, by the forcing apart of the sutures, if that be possible, but by the application of physiological force, which will simulate the natural stimuli of use, or function.

Bearing our premise clearly in mind, why should we hesitate to interfere in a case, even in young childhood, where the jaws were not developing normally?

Why should we not supply the indicated stimulus?

If this be ''meddlesome interference,'' make the most of it.

I respectfully submit that the expressed fears of the essayist, that early treatment may cause impaction, misplacement of the permanent teeth, etc., are not clinically borne out. I only wish, with all my heart, that the essayist's statement that ''teeth cannot be moved without bringing about physiological change'' was true—what a load would be lifted from our shoulders and how simple the correction of malocclusion would be! Unfortunately, like so many desirable things, it is not true, as the essayist shows in completing the sentence, but it is true that a physiological change can be brought about by moving teeth, and this is the change we are all prayerfully trying to accomplish.

Where the essayist shows a few specimens of skulls to prove his contention that ''a wide arch means a narrow nasal floor, a narrow arch a wide nasal floor'' we cannot follow him, and after listening carefully to his evidence we are far from persuaded that he is near right, and I therefore crave your permission to present a few thoughts and facts which seem pertinent and which are incompatible with his theories.

First, I would attack his premise that the various arches shown are normal; I am unable to see how the essayist or anyone else can pronounce an upper arch alone as normal without considering its relation to the lower. An arch may be of good width and yet not be normal. The width of the upper arch alone has only a relative relation to the question of normality, and I refuse to accept the measurements the essayist gives for normal arches as really constituting any standard of scientific value, as those measurements were arrived at by measuring a number of skulls and then arbitrarily saying a normal arch is so many millimeters wide. The only way I can imagine of deciding what is normal and what is not is by considering the occlusal relation of the upper and lower arches together.

The view of some of the upper arches shown gives one no idea of the inclination of the teeth; it would be quite possible to have a normal width between the first molars and yet have the teeth so inclined that the apical circle was entirely too small and thus have what the essayist calls a normal arch and yet have a narrowed nasal floor, it is precisely this condition we may be confronted with in those cases of malocclusion in which we have a lack of vertical development and an excessive overbite.

It is a developmental fact that the principal growth of the face is downward and forward; it is likewise true that the superior arch cannot be narrowed without preventing the roof of the mouth and the floor of the nose from growing downward normally, and we would be glad to learn how the septum can grow downward and forward without buckling in these cases when the arches do not develop to normal width, and if it does buckle, will the essayist still contend "a narrow arch means a wide nose," etc.?

Wright, of Boston, has devised an instrument for the measurement of the internal width of the nose between the antral walls, and records some thirty cases in which the superior arch was expanded, the malocclusion corrected and the distance between the antral walls increased by actual measurement. Drs. G. I. V. Brown, Barnes, Ainsworth, Mendell and others all report cases in which the improvement in the nose was marked following expansion of the superior arch, the improvement ranging all the way from actual increase in width by measurement, recorded by Wright, to straightening a deviation of the septum by Wright and others, and yet the essayist ignores all this clinical evidence or explains it by assuming that Wright measured a nose in which the soft tissues were turgid and swollen from lack of use, and then measured them again after the child had become a normal breather and the nasal tissues were normal, thus being fooled by the thickness of the soft tissues.

The essayist disregards Wright's specific statement that his measurements are taken between the antral walls below the lower turbinals, where the character of the membrane is thin and the epithelium attenuated, and that he prepares this region before measurements are taken by applying gauze saturated with 4 per cent cocain and adrenalin solution for five minutes. Clinical observation shows that anything like an extensive malocclusion is always accompanied by some abnormality in the nose, the difficulty, on account of the rarity of normal occlusion, to prove the reverse is obvious.

Please consider a transverse section of the skull in the first molar region, note the relation of the molar roots to the antrum and to the floor of the nose.

You, gentlemen, all have some understanding of mechanics and the principles of leverage; consider if those molars were moved laterally a quarter of an inch or more and held there, can you believe for a moment the change in leverage will permit the roof of the mouth or the floor of the nose to remain where it is now? I am unable to resist the temptation to direct the essayist's attention to Dr. Lawrence Baker's experiments on rabbits and his beautiful specimen showing how impossible it is to disturb the normal developmental stimuli of use of the jaws without affecting the entire development of the skull. These experiments alone bring the essayist's expressed views that "the expansion of the upper arch has no effect on the floor of the nose" into rather sharp relief.

I feel like apologizing for taking up so much time, but many of the theories advanced in this paper appear to me so open to attack that even now I have left untouched a number of important points.

However much one may disagree with Dr. Cryer's theories, it is impossible to look at his beautiful slides and withhold one's admiration, and I sincerely hope the years will deal kindly with him and that he may come back again and again to stir us up.

*To the Editor:*

I wish to thank you for the proof of the members who discussed my paper. As there was no stenographer present, my closing of the discussion was not reported. I wish to say, however, I am under many obligations for the kind remarks of Dr. Biddle and thank him heartily for his appreciation. In answer to Dr. Singleton, it is only necessary to refer him back to the body of my paper.

I am under many obligations to the Odontological Society of Western Pennsylvania and their friends and wish to express my thanks for their kind courtesy while at their meeting and at the dinner at Beaver Falls.

Sincerely yours,

M. H. Cryer.

1623 Walnut St., Philadelphia, Oct. 17, 1912.

# THE CONDYLE PATH — ITS IMPORTANCE AS A FACTOR IN MASTICATORY EFFORT AND MEANS OF REGISTRATION.*

BY JAMES H. PROTHERO, D.D.S., CHICAGO, ILL.

THE EFFICIENCY of a machine is dependent upon its general fitness for the work which it is designed to perform, the correct proportion and strength of its internal parts, and the proper assembling of these several elements so that when in operation co-ordinate movements result. Otherwise kinetic energy is dissipated and the usefulness of the mechanism is impaired.

The mandible with its complement, the upper maxillae, may be regarded as a machine for grinding, triturating and preparing food for introduction into the digestive tract. It represents a double or divergent lever of the third class, viz., one in which the power is applied between the fulcrum and the weight to be overcome. (Fig. 1.) Unlike the ordinary lever, however, the condyle heads which represent the fulcrum ends of the mandible, are not confined to specific points of rotation, but shift or glide in definite paths formed by the anterior walls of the glenoid fossae and the

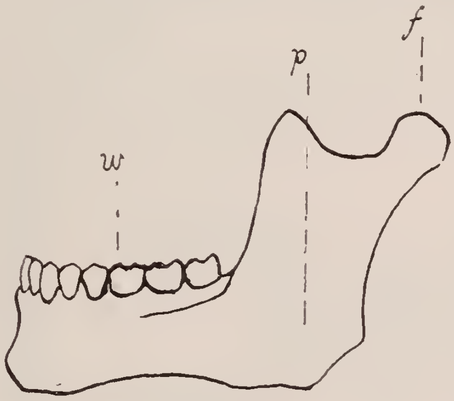

Fig. 1

Fig. 1. The Mandible as a lever of the third class

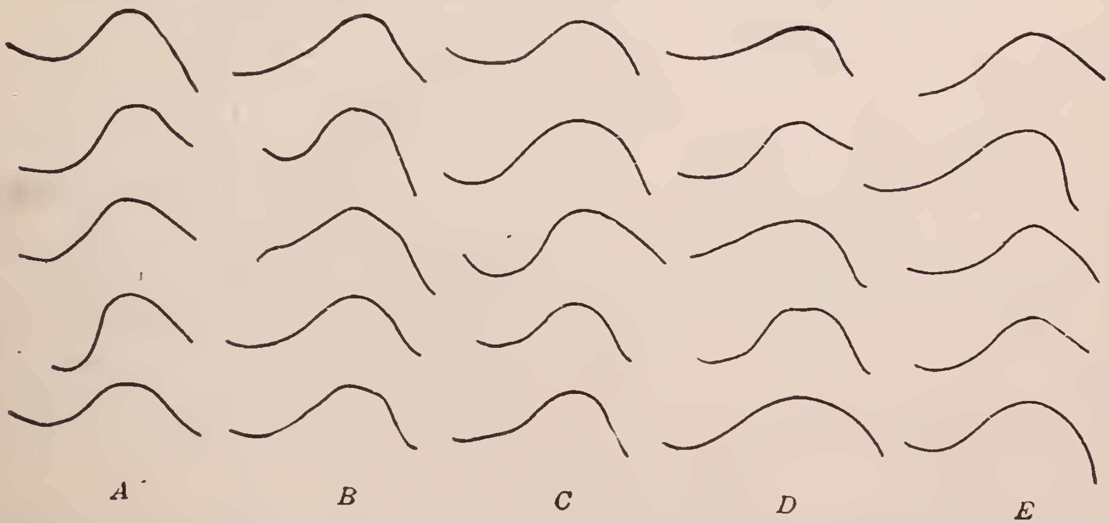

Fig. 2

Fig. 2. Graphic outlines of the glenoid fossae, left side, after Tomes and Dollimore.

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*An address before the Michigan State Dental Society, 1912.

*eminentia articularis,* situated immediately in front. This path is known as the condyle path.

The research work of various investigators shows conclusively that the condyle paths, or fulcrum tracts of the condyle heads, vary greatly in different individuals, in their angles of inclination, as they pass forward and downward. Variations ranging from a horizontal plane to an angle of 70 degrees have been recorded. (Fig. 2.) Frequently in the same subject a marked difference in the two paths is occasionally apparent.

Under normal conditions the cusps of the teeth are so formed, and the teeth themselves so placed in their respective arches, that in lateral and protrusive movements the cusps of the lower teeth glide freely along definite paths between those of the upper, without interference. In other words, there is co-ordination of movement between the condyles in their paths, and the lower against the upper teeth in their paths, thus enabling the full amount of masticatory effort to be expended in work, with no disturbance or incoordination.

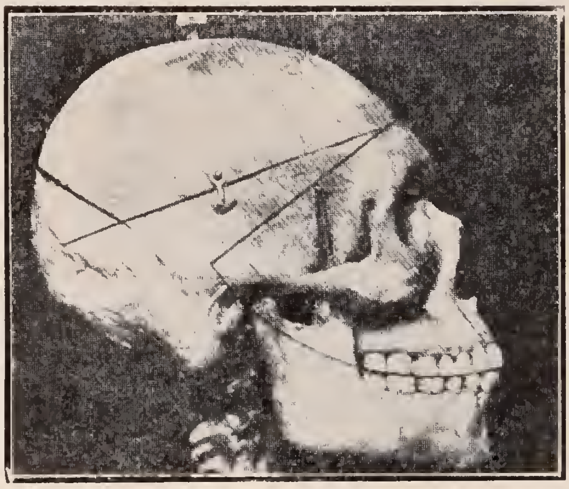

Fig. 3

Fig. 3. Parallel relationship of the compensating curve and the condyle path.

Eliminating the cusps, the upper teeth represent a section of a convex sphere, and the lower a section of a concave sphere of corresponding size. The center of this occlusal sphere varies, being located at a distance ranging from five inches above the occlusal planes, to infinity. (Fig. 3.) The center from which the occlusal planes are developed is also the center of the curved line in the condyle path along which the condyle moves in active masticatory effort. (Fig. 4.) This necessarily establishes a coincident or parallel relationship between these two sliding contact points of the machine, and results in coordinate action. (Fig. 5.)

This is Nature's method as displayed in the normal human masticatory apparatus, and in studying it Bonwill conceived and developed the system of constructing artificial dentures, which bears his name. His efforts, while of inestimable value, were not far reaching enough to cover the entire field. The system developed by him had no provision for registering the variations in the condyle paths previously alluded to, and no means for correctly mounting models on the occluding frame; and while dentures constructed by his system were occasionally entirely satisfactory, in many cases lateral movements were not possible because of incoordinate action between the occlusal planes of the teeth and the condyle paths.

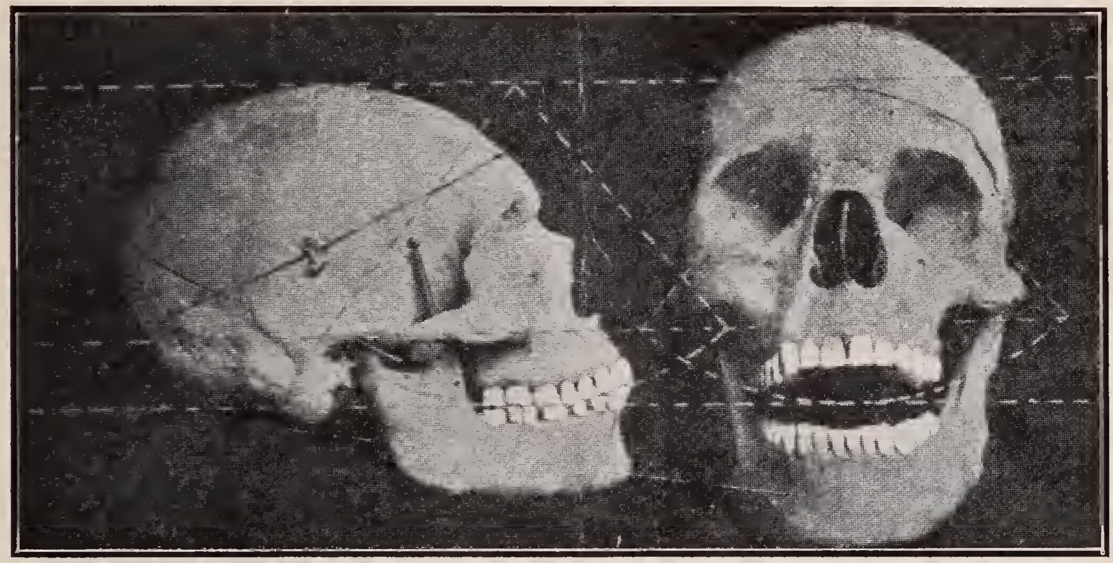

Fig. 4

Fig. 4. Side and front view of the same skull, showing the spherical arrangement of the teeth.

The efforts of Bowdich and Luce in 1889, and Walker in 1894, to determine more exactly the true condylar movements, have since proven to be essentially correct, although at the time but little practical use was made of their findings.

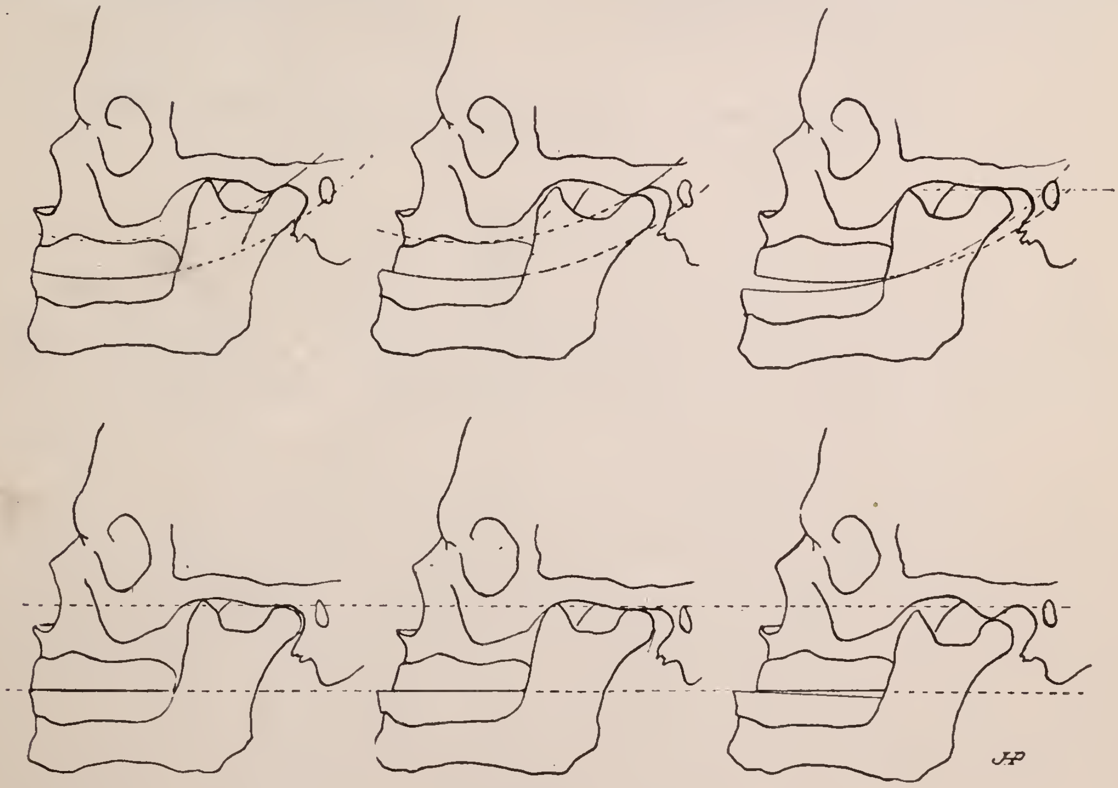

Fig. 5

Fig. 5. Diagrams illustrating coordinate and incoordinate action resulting from a parallel or divergent relation between the condyle paths and planes of occlusion of the base-plates.

For a number of years following the research work mentioned, there still remained three prominent breaks in the chain of technical steps to be worked out and logically connected in order to render the system of practical utility. These were:

First.—Some simple means of determining the angular inclination of the condyle paths in each individual patient. Christensen and Gysi have each devised practical methods for accomplishing this, differing somewhat in detail, but arriving at essentially the same results.

Second.—An occluding frame, or articulator, capable of reproducing the masticatory movements of each patient as indicated by their condyle register. Walker, Kerr, Snow, Christensen and Gysi have devised appliances capable of imitating, with a greater or lesser degree of accuracy, the mandibular movements.

Third.—Some means for correctly mounting models on the occluding frame so that their alveolar planes will bear the same relation to the hinges, or rotation points, that the natural planes sustain to the condyles. The "face bow" designed by Snow and the "condyle register" designed by Gysi are well adapted for carrying out the last step mentioned.

Thus the system has been improved and broadened, and while not absolutely perfect, it is practical and inconceivably better than the old, or even the Bonwill method.

To present this subject briefly and clearly, the principal procedures in their logical order will be outlined, and as seems necessary, some of the more important steps will be enlarged upon.

Since in edentulous mouths the only guiding factors of the masticatory mechanism remaining are the condyle paths, a description of the steps followed in the construction of a full upper and lower denture will be most appropriate.

## IMPRESSIONS

When properly manipulated, a good quality of modeling compound will yield a more accurate impression than plaster. The use of this material is contra-indicated in cases of flabby ridges; when natural teeth are present; or where undercuts exist; in all of which plaster is indicated.

Place softened compound in a suitable tray and take as accurate an impression as possible. Remove from mouth, chill thoroughly and trim off excessive surplus. Invert over a small alcohol or Bunsen flame and reheat impressed surfaces to the depth of 1 to 2 m.m. Dip the impression quickly in warm water to prevent compound from sticking to tissues, and return to mouth. Press strongly and steadily on the tray for three or four minutes. Sometimes the process of chilling and reheating, as described, is repeated a second time, decidedly beneficial results being noticeable each time in the greater effort required to dislodge the impression. The heavy continued pressure forces the thin layer of softened compound away from hard to soft areas, thereby insuring a more uniform bearing of the denture on the tissues. When finally chilled the central palatine portion of the impression should be slightly scraped, not to form a vacuum chamber, but to relieve the pressure of the denture on the hard area so commonly present in this location. Usually the surface scraped should extend slightly beyond the hard area and in depth should not exceed one-half m.m., the margins tapering away to an indefinite outline.

### MODELS

The inherent tendency of all varieties of plaster is to expand in setting. When confined by the sides of the impression and tray, warpage of the model results, the palatine portion of the latter rising to a slight extent. To obviate this difficulty remove the impression as soon as possible after the plaster constituting the model has set. This can usually be done in from ten to fifteen minutes after filling the impression. Although this method obviates warpage, it does not control expansion, which goes on for twenty-four hours or more. The expansion is compensated for by scraping a shallow, rounded groove around the labial and buccal periphery, and a sloping but definite groove across the distal palatine portion of the model at the point where the distal margin of the denture will terminate.

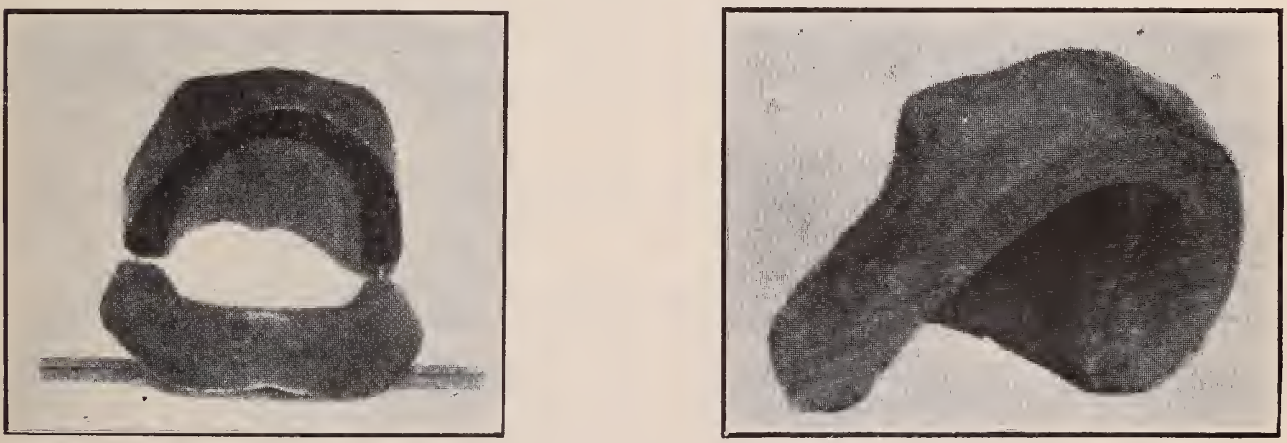

Fig. 6 Fig. 7

Fig. 6 and Fig. 7. Base-plates on which rims of wax are built to represent the length of teeth and border lost by absorption.

Models should be of sufficient thickness to withstand stress exerted in closing the packed flask, usually not less than 8 m.m. thick in their thinnest part.

### CONSTRUCTION OF BASE-PLATES

In constructing dentures with metal bases, the latter should be swaged and fitted in the mouth and trimmed to correct peripheral outline. In vulcanite work, base-plates of some rigid, unyielding material should be conformed to the models and trimmed to correct form. "Ideal baseplate" is the best for this purpose because it is capable of withstanding stress and will not soften under oral temperature. It is supplied in two thicknesses, the thicker being preferable for general work.

The model is set face upward on the bench, a sheet of "Ideal baseplate" evenly adjusted over it, and heat applied, using the soft brush flame of the blow-pipe. When it begins to soften and settle down it can readily be conformed with the fingers, being careful not to use undue pressure, as this would thin and weaken it in places. Overheating should also be avoided, as it will adhere to the model when very soft. The peripheral surplus is removed with a hot, sharp-pointed spatula, using it as a knife, and the margins smoothed down with a medium coarse file. In vulcanite work, the base-plates are frequently vulcanized first, the teeth being afterwards attached in the usual manner. This method is productive of excellent results, as the base-plates retain their position better and will not break in the subsequent steps of fitting in the mouth.

### CONSTRUCTING THE BITE-PLATES

On the base-plates, of whatever character used, rims of wax should be built to represent approximately the length and position of the natural teeth and such restoration of the alveolar process, lost by absorption, as may be necessary. (Fig. 6.) The rims should be about 8 or 10 m.m. wide and constructed with flat planes from before backward, as well as from side to side. (Fig. 7.) The wax of which they are formed should be of a hard variety, thoroughly united and firmly attached to the base-plates with a heated spatula.

*(To be Continued)*

## FILLING DUPLEX TIN AND GOLD.*

BY W. J. BOYDSTON, D.D.S., FAIRMOUNT, W.VA.

This demonstrates the way I use duplex. You have better adhesion with tin and gold; do not have any adhesion with pure tin. I use this for lining; do not make gold fillings out of it, although you can. I have instruments especially prepared for the work. If you continually stick instruments into duplex you get an amalgam and make a gray surface. I use an instrument to hold it and do not use any more pressure than is absolutely necessary; do not use a heavy pressure to get the tin and gold well down; it is something like rocking a chair. Tin is the best tooth preserver we have; consequently, if you get the cavity filled and gold over it you have a pretty good filling, from the preserving standpoint. Any conventional preparation of cavity is all right for this work. I do not depend on the adhesion of my gold and duplex. I make a depression in my tin for a retaining point, and then I take as much care in starting that as in any other filling. Much depends on the position of your cavity. You will find there is some adhesion to this. You get good adhesion, but never depend entirely upon the adhesion of your gold foil and duplex to hold the gold; always have more or less of an undercut.

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*Clinic before the West Virginia Dental Society, 1912.

**Mere busy-ness isn't business or a pig's tail would be the most efficient part of the pig.**

# PROPOSED NEW DENTAL LAW FOR MICHIGAN.*

## A BILL,

To amend Sections 1, 2, 3, 4, 5, 7, 8 and 9, of Act 338 of the Public Acts of 1907, entitled "An act to provide for the examination, regulation, licensing, and registration of persons engaged in the practice of dentistry, and for the punishment of offenders against this act, and to repeal all acts and parts of acts in conflict herewith."

The People of the State of Michigan enact:

Section 1. Sections 1, 2, 3, 4, 5, 7, 8 and 9 of Act No. 338, of the Public Acts of 1907, entitled "An act to provide for the examination, regulation, licensing, and registration of persons engaged in the practice of dentistry, and for the punishment of offenders against this act, and to repeal all acts and parts of acts in conflict herewith," are hereby amended to read as follows:

Section 1. It shall be unlawful for any person not a registered dentist within the meaning of this act (to own, rent, operate, or control any room or rooms, office, or dental parlors where dental work is done, provided or contracted for), to practice dentistry or dental surgery in any of its departments in the State of Michigan, except as hereinafter provided.

It shall be unlawful for any person or persons, whether registered or not, to operate or run any dental office or parlors under any name or corporation name other than the name to whom the license is issued.

Sec. 2. The Governor shall appoint, by and with the advice and consent of the Senate, five resident electors of the State, who shall constitute a Board of Dental Examiners. Such appointments shall be made from a list of twenty names submitted to the Governor annually by the Michigan State Dental Society, which said list shall be selected in open meeting of the Michigan State Dental Society, and shall contain only the names of electors and reputable dentists, and graduates of a reputable dental college, who have resided in this State for at least five years, and have at least five years' experience in their profession. Such list is to be certified under oath of the secretary of the above named society, as to the qualifications as above set forth, of each person named therein, and filed in the office of the Secretary of State, at Lansing, on or before the fifteenth day of September of the present year, and each and every year thereafter. In the event that the secretary shall for any cause neglect, omit or refuse to file as aforesaid such list, then and in that case the Governor shall appoint or fill the vacancies on said board without reference to such list, which the aforesaid society has for any cause neglected, omitted, or refused to file with the Secretary of State, as herein mentioned aforesaid, but the qualifications of the persons appointed shall be the same as above set forth. The members of the board holding office at the time of the passage of this act shall be continued in office as members of the State Board of Dental Examiners until the expiration of the term for which they have been appointed. On January 1st, 1914, and annually thereafter, the Governor shall appoint, in the manner aforesaid, one member of said board, whose term of office shall be for a period of five years. The several members of said board shall hold office until their respective successors are appointed and qualified, and if any vacancy occurs in said board, another shall be appointed as aforesaid, to fill the unexpired term thereof. . . . . Said board shall have full powers to make by-laws and necessary regulations for the proper fulfillment of their duties under this act. It shall choose one of its members president and one secretary-treasurer, and shall hold two regular meetings each year, at such dates and places as may be deemed best. Special meetings may also be held. A majority of the board shall constitute a quorum for the transaction of business. Said board shall keep a full record of its proceedings, and a full registry of all persons licensed and certified as dentists by said board, which shall be public records and at all times open to inspection as such. A transcript of any of the entries in such record, certified by the secretary-treasurer under the seal of said board, shall at all times and places be competent evidence of the facts therein stated. The members of said board shall have the power to administer oaths and hear testimony in all matters relating to the duties imposed upon it by law. Said board shall make an annual report of its proceedings to the Governor on or before the first day of January in each year, which report shall contain a full and complete record of all its official acts during the year immediately proceeding, as well as an itemized statement of all receipts and disbursements. A sufficient number of copies of such reports shall be printed in the same manner as other reports of State officers, and boards are now printed, under Act No. 44 of the Public Acts of 1894, as amended, to supply the office of the Secretary of State with one hundred copies for future distribution, and as many copies for use and distribution under the direction of the said board as the said board may deem necessary, but the whole number of copies printed and published shall not exceed twenty-five hundred: Provided, That not to exceed two hundred copies shall be bound in any other binding than paper: Provided further, That the cost of said printing and binding, after audit and allowance by the State Board of Auditors, shall be covered back into the state treasury by the Board of Dental Examiners.

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*Proposed and Endorsed at the annual meeting of the Michigan State Dental Society, 1912.

SEC. 3. All persons who desire to begin the practice of dentistry in this State after the passage of this act, and who shall have a license from the dental board of another State (requiring preliminary education before examination for license equal to the standard required of applicants for examination for registration in this State), or who shall have received a diploma from the faculty of some reputable dental college duly organized under the laws of this or any other State of the United States, shall have the right to apply to the dental board of this State for examination as to their proficiency; and all successful applicants shall be licensed and registered by said dental board: Provided, That nothing in this act shall deprive a candidate who has already appeared before the board and failed on examination from the privilege of re-examination. Said dental board shall be authorized to ascertain and determine what shall constitute a dental college or institution in good standing and repute; but no such dental institution shall be considered reputable unless the same shall possess the following qualifications:

First.—It shall be chartered under the laws of the State in which it is located and operated, and shall be authorized by its charter to confer the degrees of Doctor of Dental Surgery or Doctor of Dental Medicine;

Second.—It shall deliver annually a full course of lectures and instructions by competent faculty and corps of instructors in the following subjects: Anatomy, chemistry, physiology, histology, materia medica, therapeutics, dental metallurgy, pathology, bacteriology, operative dentistry, prosthetic dentistry, crown and bridgework, and oral surgery and hygiene, said course of instructions to consists of not less than three terms in separate academic years and of not less than thirty-two weeks of six days for each week, and shall require its matriculates to have a preliminary education of at least four years in a credited high school, college or university of equal standard.

Third.—The apparatus and equipment of each said dental college or institution shall be ample and sufficient for the ready and full teaching of the above named subjects, and every such college shall allow said State Board of Dental Examiners of this State the privilege of inspecting its work and equipment at any time.

SEC. 4. Any dentist may have his license revoked or suspended by the Board of Dental Examiners for any of the following causes:

First.—His conviction of a felony or misdemeanor involving moral turpitude, in which case a record of conviction or a certified copy thereof, certified by the clerk of the court or the judge in whose court the conviction is had, shall be conclusive evidence, Second.—For unprofessional conduct, or for gross ignorance or inefficiency in his profession.

Third.—Unprofessional conduct shall mean, employing what are known as "cappers" or "steerers" to obtain business; or obtaining of any fee by fraud or misrepresentation; wilfully betraying professional secrets; employing directly or indirectly any student, or any suspended or unlicensed dentist, to perform operations of any kind, or to treat lesions of the human teeth or jaws, or to correct malimposed formations thereof, except that an unlicensed person may perform merely mechanical work upon inherent matter in a dental office or laboratory; the advertisement of dental business or treatment or devices in which untruthful, improper or impossible statements are made, or habitual intemperance, or gross immorality. The proceeding or revoking or suspending any license under the first subdivision of this section must be taken by the board, on receipt of a certified copy of the record of conviction. The proceedings under the second subdivision of this section may be taken upon the information of another. All accusations must be in writing, verified by some party familiar with all facts therein charged, and three copies thereof must be filed with the secretary of the board. Upon receiving the accusation the board shall, if it deem it sufficient, make an order setting the same for hearing and requiring the accused to appear and answer thereto, at said hearing, at a specified time and place, and the secretary shall cause a copy of the order and of the accusations to be served upon the accused at least twenty days before the day appointed in the order for said hearing, either personally or by registered mail. The accused must appear at the time appointed in the order, and answer the charges and make his defense to the same, unless for sufficient cause the board assign another day for that purpose. If he do not appear the board may proceed and determine the accusation in his absence. If the accused pleads guilty, or refuses to answer the charges, but upon the hearing thereof the board shall find them, or any of them, true, it may proceed to a judgment revoking his license, or suspending it. The board and the accused may have the benefit of counsel, and the board shall have power to administer oath, take the depositions of witnesses in the manner provided by law in civil cases, and to compel them to attend in person before it, the same as in civil cases, by subpoena issued from the signature of the same, and the seal of the board, and in the name of the people of the State of Michigan. Upon the revocation of any license the facts shall be noted upon the records of the Board of Dental Examiners, and the license shall be marked as cancelled upon the date of its revocation.

Sec. 5. All persons entitled to examination as provided in this act shall file application in writing, supported by affidavit, stating the facts which entitle him or her to such examination, and each applicant shall, before taking said examination, present to said board his or her license or diploma for verification as to its genuineness. All applicants for examination shall, at the time of making such application, pay to the secretary-treasurer of the dental board a fee of twenty dollars, and each applicant shall present himself before the said dental board for examination at the first or second regular meeting after his application shall have been made, and in default thereof said fee shall be forfeited to said dental board. The fee for any subsequent application for examination or re-examination shall be ten dollars. The examination may be written or oral, or both, at the option of said board, and shall include the following subjects: Anatomy, chemistry, physiology, histology, bacteriology, operative dentistry, prosthetic dentistry, crown and bridgework, and oral surgery, and oral (and orthodontia) hygiene. The examination paper of each applicant, with his or her name appearing thereon, shall be preserved by said board for a period of six months from and after the date of the writing of said examination paper and shall be subject to public inspection. During the period of six months, if any successful applicant so desires, he or she may, upon the deposit of $50.00 with said Board of Dental Examiners, have the privilege of having his or her examination paper re-read by said Board of Dental Examiners in presence of his or her representative and if, upon re-reading, said applicant's paper shall be determined by said Board of Examiners to be of sufficient percentage to entitle such applicant to the license to practice in this State, then said Board of Dental Examiners shall refund said unsuccessful applicant the sum of $50.00 deposited with said Board of Dental Examiners for the purpose of securing a re-reading of said applicant's paper. All persons of good moral character who shall (successfully) pass such examination shall be licensed and registered by said dental board and shall receive a certificate of such license and registration, duly authenticated by the signature of the members of the board and with the seal of said board attached; and in no case shall said examination fee be refunded, but said dental board may, for sufficient cause, remit said fee for subsequent re-examination. Every registered dentist shall, on or before the first day of May of each year, except the one in which he is registered, pay to the secretary of the Board of Dental Examiners a license fee of one dollar. The year for which a fee shall be paid shall begin on October 1st, following the May when it becomes due, and end the succeeding September 30th. In case any person defaults in paying said fee his license may be revoked by the Board of Dental Examiners, on thirty days' notice in writing from the secretary, unless within said time said fee is paid. Upon the payment of said fee the board shall reinstate the delinquent license. On or before the first day of July each year the secretary of the board shall send to the county clerk of each county in the State a certified list of all practicing dentists therein who have paid said fee, and the clerk shall enter or paste the same in the register of said dentists.

SEC. 7. All persons shall be said to be practicing dentistry, within the meaning of this act, who shall use the work or letters ''Dentist,'' ''D.D.S.'' or any other letters or title in connection with his name which in any way represents him as engaged in the practice of dentistry, or who shall advertise or permit it to be done by sign, card, circular, handbill, newspaper, or otherwise, that he can or will attempt to perform dental operations of any kind, treat disease or lesions of the human teeth or jaws, or replace lost teeth by artificial ones, or attempt to correct malposition thereof, or who shall for a fee, salary, or other reward, paid or to be paid, either to himself or to another person, perform dental operations of any kind, treat diseases or lesions of the human teeth or jaws, or replace lost teeth by artificial ones, or attempt to correct malposition thereof. But nothing contained in this act shall be taken as applying to the acts of legally qualified physicians in the extraction of teeth, in the performance of their duties as such, or to acts of bona fide students of dentistry done in the college building, in the pursuit of clinical advantages while in attendance upon a regular course of study in a reputable dental college. Any licensed dentist owning, running, operating or controlling any room or rooms, office or dental parlors where dental work is done, provided or contracted, who shall employ, keep or retain any unlicensed dentist or student as an operator shall be guilty of a misdemeanor and punished as provided in Section 9.

SEC. 8. Out of the funds coming into the possession of said board, as above specified, the members of said board may receive as compensation the sum of ten dollars for each day actually engaged in the duties of their office as such examiners, and actual necessary expenses. Said expenses shall be paid from the fees and assessments received by said board under the provisions of this act, and no part of the salary or expenses of said board shall be paid out of the State Treasury. The secretary-treasurer of said board shall from time to time give such bond for the faithful discharge of his duties as the custodian of funds of said board as it may direct. Said board shall appropriate from any fund under its control a sum of not to exceed five hundred dollars annually as compensation for the services of the secretary-treasurer. All moneys received in excess of said per diem allowance and mileage, as above provided for, shall be held by the secretary-treasurer of said board as a special fund for other expenses of said board, and for carrying out the provisions of this act.

SEC. 9. Any person who shall practice, or attempt to practice, dentistry either as proprietor, employee, or assistant, without having a license, or without having his license renewed as provided by Section 5 of this act, or without keeping his license in open view in his operating room, shall be punished by a fine of not less than fifty dollars nor more than two hundred dollars, or by confinement in the county jail not less than twenty days, or by both such fine and imprisonment. It is hereby made the duty of the prosecuting attorney of each county in the State to prosecute every case to final judgment whenever his attention shall be called to a violation of this act.

## REPORT OF A CASE OF NECROSIS.*

BY DR. F. R. TALLEY, PETERSBURG, VA.

THIS paper is not intended as a scientific treatise upon necrosis, nor is it the purpose of the writer to lead you to think that, according to his idea, the case was handled in a very scientific manner; but it is merely intended to show what can be done by a green man in a crude way if the effort is made when the opportunity presents itself and as a word of encouragement to any who might hesitate to tackle such a case.

The case was handled in my father's office during vacation after the writer had completed his second term at the Medical College of Virginia. The patient was about forty years old, very fine physique and rather robust. The cause of trouble was the impaction of the third molar of the inferior maxillary on the right side which made its appearance slightly above the angle, and was directed in almost a straight line mesially, the grinding surface resting against the distal surface of the second molar.

I did not see the patient upon his first visit to my father's office, which was about June 1st, 1892. Upon his second visit, which was about July 1st, I was present and saw the patient and was told by my father that upon the patient's first visit, it being impossible to gain access to the third molar for the purpose of extraction, he suggested that the second molar be removed, thus allowing the offending tooth to erupt without further trouble and that he cautioned the patient that unless this was done serious trouble would, in all probability, be the result. The patient refused and left the office.

The conditions existent upon this second visit were a badly swollen cheek, sublingual and submaxillary glands extremely sore, teeth somewhat loosened and raised in their sockets, not allowing the patient to masticate his food at all. The patient was in constant pain and unable to sleep. At this time I made the suggestion that we remove the second molar and told the patient that unless this was done I was convinced necrosis would be the result. He still obstinately refused this advice and left the office. The next time I saw the patient was thirty days later, when necrosis was in full sway. He had spent three weeks in bed, attended by a physician, whose only treatment was borolyptol as a mouth wash. The physician had removed the second bicuspid and first molar with his fingers, the second and third molars had lost their sockets and were in such a condition that they could almost be removed by the same method. He had an opening on the neck just below the angle of the jaw and directly over the carotids and jugular vein, through which exfoliated bone and pus were constantly passing. He had several larger pieces of bone in a pill box which he showed me. He was much depressed and very greatly weakened by his enforced fasting and was suffering more or less from constipation. All things being considered, he was in a rather deplorable condition. I told the patient that since he had repeatedly refused the advice given him that he was responsible for his condition and that if I took his case I would assume no responsibility whatever, and he would have to consent to follow my instructions to the letter. By this time he was ready to consent to anything, and agreed to my proposition.

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*Read before the Virginia State Dental Society, 1911.

I first removed the second and third molars. I then washed the sockets and the fistula out with hydrogen peroxide, followed by hot water, and after making a 5% solution of sulphuric acid, injected this, using an all-glass syringe, through fistula which opened into the socket of the second molar. I then packed the fistula with iodiform gauze to prevent its closing and curtailing the drainage. I then directed the patient to take calomel that night, followed by salts in the morning, and dismissed him for that day.

I saw the patient every day, and after two or three visits, at which times the first treatment had been repeated, I commenced to currette the diseased bone by passing the instruments through the opening in the neck under the periosteum; and in course of time I removed the entire outer plate of the bone from the angle of the jaw to the canine.

I repeated the dose of salts every two or three days until three doses had been taken and then kept the patient from constipation with mild purgatives during the treatment. I also gave him iron, quinine and strychnine tonic and made him stay out of doors, eat all the nourishing food he could get and after about a week or ten days, at my advice, he secured some light out-door work, from which he derived great benefit, not only from the exercise, but through his attention being directed to other subjects than himself.

As the sulphuric acid became too severe for the improving conditions, incident to the returning life in the tissues, I diluted the solution until it was fairly comfortable and proceeded with treatment as at first. After six weeks I sent the patient to the physician cured.

The experience was not all sunshine for me, I can assure you, for I was very much discouraged several times, especially after the first week had passed and no apparent results were obtained. At this juncture I came to Richmond and consulted Dr. Richard C. Walder, who was then professor of oral surgery at the Medical College of Virginia, and after he had assured me that the treatment was all right and cautioned me not to be too impatient I took on courage and did not lose heart again.

As in all other callings, the material side unfortunately has to be considered, and in this particular case the remuneration was very much the shape of a barrel hoop, or any other circular arrangement, with nothing in front or behind it. The patient was a workingman, had, he said, paid the doctor a dollar every time he came, until his money gave out and then the doctor magnanimously advised him to see a dentist.

But never mind the fee, or rather lack of it. We have had the experience, we have the information, or think we have, and when the next fellow comes along who can pay we will just jot down the figures and multiply by two.

## BANDED LOGAN CROWN.*

BY O. W. BURDATS, D.D.S., WHEELING, W. VA.

Excision of tooth under gum margin; paring edges of root for fitting band; reaming bifurcated roots; splitting dowel; grinding and fitting same, making perfect occlusion, and setting with cement. The root had not been previously treated, but next day showed no bad results on account of lack of treatment.

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*Clinic at West Virginia State Dental Society, 1912.

THE DENTAL SUMMARY is pleased to announce the appointment of Dr. Charles H. Oakman, of the Detroit Board of Health, as oral surgeon to Harper Hospital on December 18, 1912. Dr. Oakman is well known to a large circle of professional confreres who will be glad to learn of his preferment.

## NOTICE

The committee in charge of the Women's Dental Department of the Suffrage Pageant, to be held in Washington, D. C., March 3, 1913, would like to hear from all women dentists who can and will be present and march at that time. Any communications or contributions should be sent to Dr. Rosalind M. Bain, 1301 Fairmont St., N. W., Washington, D. C., or to Dr. Centennella C. Smith, 817 14th St., N. W., Washington, D. C.

*Committee in Charge.*

## Chicago Dental Society

Chicago, Ill., Dec. 27.—At the annual meeting of the Chicago Dental Society, held at 31 W. Lake street, Chicago, the election of officers resulted as follows: President, Geo. N. West; vice president, P. G. Puterbaugh; secretary, T. L. Grisemore; treasurer, F. E. Roach; librarian, E. D. Coolidge. Two members of the Board of Directors, Wm. H. G. Logan, F. W. Gethro. Board of Censors, P. B. D. Idler, H. C. Peisch, A. M. Hewitt.

# EDITORIAL

## The Conservation of Public Health.

Governor James M. Cox, of Ohio, has taken a progressive stand in connection with the conservation of the health of the people of his State.

In order to better formulate progressive health legislation, he requested that a conference of the allied boards and organizations, having to do with health matters in general, be called with a view of submitting a tentative draft of proposed legislation of these various interests and that members of these boards and organizations occupy an advisory position in matters of legislation that will be taken up during the coming session of the Ohio General Assembly. Accordingly, the secretary of the State Board of Health called a meeting to be held in Dayton, December 26th, 1912, inviting representatives from the State Board of Health, State Registrar of Vital Statistics, the State Medical, Dental, Veterinary, and Pharmacy Boards and Associations.

The plan has for its purpose the conservation of public health, and it was inaugurated with the end in view of establishing a workable system by which this aim may be attained.

In speaking for the dental profession, Dr. W. A. Price, president of the Ohio State Dental Society, said in part:

"The purpose of our meeting here today is to try to agree upon some plan that will bring about a general betterment of health conditions, and with reference to the dental profession, especially, we hope to secure some legislation that will enable the children of poor parents to receive the attention that ought to be given the teeth and mouth of every child in the country. We feel that there ought, also, be some system worked out that will assure a proper care of the teeth, whether it be a matter of education or by compulsory measures. The most competent authorities tell us that the mouth is the most important orifice of the body, as far as the preservation of health and general welfare of the body is concerned, and yet it is the orifice that is given the least attention. In Philadelphia there are seven competent dentists employed by the municipality to give the needed attention to the mouths of children whose parents are financially unable to furnish such care."

Dr. E. F. Campbell, secretary of the State Board of Health, expressed substantially the same sentiment as was uttered by Dr. Price with reference to the importance of a proper conservation of health, and voiced his gratitude for the opportunity that had thus been extended by Governor-elect Cox to the men engaged in the various professions to act even in an ad visory capacity. "There are certainly important matters," said he, "that ought to be brought to the attention of the legislators, and we are certainly sensible to the significance involved in the privilege we have been granted."

Governor Cox attended the first session and offered to lend every assistance that the problem of conservation of the health of the people of the State may be most effectively solved, and that proper legislation to this end may be enacted.

There were about thirty at the conference and all were impressed with the interest Governor Cox is taking in health matters and with the fact that he was so well informed regarding the present conditions as well as the needs of the future. He is the first Governor to extend an invitation to members of such boards and associations to use their influence in the enactment of laws that will result in the betterment of health conditions. Governor Cox's attitude in all public questions has been strictly progressive and he should receive the commendation of all for recognizing that the health interests of a great State are worthy of every possible consideration.

## Disseminating the Knowledge of Oral Hygiene Among the Masses.

For several years past The Dental Summary and other publications have had much to say about the dissemination of knowledge of oral hygiene among the masses and urged the dentists to get behind the good work and boost. It has been well started in some sections of the country, but what has already been accomplished is but an infinitesimal part of what should be done. And if the dentists themselves do not take the initiative or shoulder the greatest part of the work the dissemination of this knowledge will never be as complete as it should.

It is one of the unwritten duties of the dentist to do all that he can for the welfare of the community, and by instruction along the line of oral hygiene he can do a world of good. Aids and assistance can be obtained by any dentists desiring them.

Some time ago the National Mouth Hygiene Association was formed to carry on an educational campaign in the interest of humanity in general and the dental profession. Mr. Horace Fletcher is president of the association and Dr. W. G. Ebersole, Schofield Bldg., Cleveland, O., its secretary. In past numbers of The Summary we have told our readers of the experimental work conducted by those at the head of this association, and the association is now trying to teach the people the lessons learned from these experiments. It has published and distributed and is still distributing educational literature in this connection.

One of the most important steps taken in their campaign, however, is the production of a motion picture film for educational purposes. This film was first shown in Washington at the National Dental Association last September and later at the International Congress of Hygiene and Demography, and the National Conservation Congress, and then before the dental societies in a number of the larger cities and before the Ohio State Dental Society in December. Every place it has been shown it has been enthusiastically received and endorsed by the members of the dental profession as the greatest aid yet offered for dental educational purposes.. We gave in detail the scenario of this film in the October number of The Dental Summary and urge all readers not yet familiar with it to refer to that issue. In a number of cities where the film has been shown, the daily press has devoted much space to describing it and the work of the association to their readers. The *Indianapolis Star* gave a full page in one of the Sunday editions. *The St. Louis Post-Dispatch, The Providence Journal, Pittsburgh Gazette* and other leading newspapers have given liberal space in exploiting this work.

The National Mouth Hygiene Association is doing a grand work, but dentists in general should not sit back and let it carry the whole burden. Every State Dental Society and every component and local society should do its share. The Association wants you to work with them. It needs your help and will at all times help you. The film referred to should be shown to the public in every city and town where it can be exhibited, and there are now few places in the United States that do not have moving picture shows.

Every State Dental Society ought to have at least one of the films and as many of the component and local societies as possible.

To further the knowledge of dental and oral hygiene among the masses it is imperative that dentists make a united effort, and if they do it, it will be one of the most telling campaigns for the betterment of health conditions of the nation that ever has been inaugurated.

## The Proposed New Dental Law for Michigan.

On another page in this issue of The Dental Summary we publish the full text of the proposed new dental law for Michigan, that those who are interested can study it. The bill has so many good features we are going to call our readers' attention to some of them in an editorial way:

Section 1 makes it unlawful for any person or persons, whether registered or not, to operate or run any dental office or parlors under any name or corporation name other than the name to whom the license is issued. With this provision, there can be no doubt as to who owns or operates the office. It furnishes a safeguard to the public and an identity from a legal standpoint.

Section 2 provides that the appointment of members of the examining board shall be made from a list of twenty names submitted to the Governor annually by the Michigan State Dental Society. This insures competent and ethical men for the board at all times and eliminates the objectionable feature of making the appointments purely political, oftentimes without due regard for fitness, as is now in vogue in many states.

Section 4 provides for revocation of license for felony or misdemeanor involving moral turpitude or for unprofessional conduct or gross ignorance or inefficiency in his profession. Under this section, unprofessional conduct is defined as meaning the employment of what are known as "cappers" or "steerers" to obtain business, or of obtaining of any fee by fraud or misrepresentation; wilfully betraying professional secrets; employing, directly or indirectly, any student or any suspended or unlicensed dentist to perform operations of any kind, etc., except that an unlicensed person may perform merely mechanical work upon inert matter in a dental office or laboratory; the advertisement of dental business or treatment or devices in which untruthful, improper or impossible statements are made; or habitual intemperance or gross immorality. This is a protection to the people and will rid the profession of the objectionable quackery practiced more or less in most other states. At the same time it gives those inclined to quackery an opportunity to practice legally if they refrain from these obnoxious methods.

Section 5. This section considers first the examination, which may be written or oral, or both, and shall include the following subjects: Anatomy, Chemistry, Physiology, Histology, Bacteriology, Operative Dentistry, Prosthetic Dentistry, Crown and Bridgework and Oral Surgery, Orthodontia and Oral Hygiene. And we understand that the subject of Anesthesia and Anesthetics has been added to this list. We are glad to note the addition, for it will legalize the giving of anesthetics by the dentist. We would like to see this incorporated in all dental laws. (We referred to this editorially in May, 1912.)

This section also gives an unsuccessful applicant the privilege of having his or her examination papers re-read by the board in the presence of his or her representative—a just provision. This section also deals with registration, requiring annual registration of all registered dentists and a license fee of $1.00. And on or before the first day of July each year the secretary of the board shall send to the county clerk of each county in the state a certified list of all practicing dentists therein who have paid said fee, and the clerk shall paste or enter the same in the register of said dentists. This is one of the important additions to the law and it should be included in the laws of all states. It enables the board and the profession at any time to ascertain who and how many are legal practitioners. If a man is practicing illegally, the absence of his name on the register is proof against him, whether he be practicing by himself or in the employ of another. It enables the board to keep a correct list of legal practitioners, which is a matter of great importance. The license fee is payable to the secretary of the board instead of to a county clerk, as in some laws, and this sum can be used for the benefit of the dental profession in prosecuting illegal practitioners or in other ways as the board may elect. The amount of the fee is comparatively nothing, and it is no more trouble to pay it each year than it is to pay taxes or for an auto license. There should be no objections raised by any dentist regarding this requirement, for it means so much to the profession of the state.

Reciprocity is provided for in the present law, and this amended part of the law does not affect that.

The Michigan dentists are to be congratulated for the preparation of such a strong law and we hope that, by united effort, they can secure its passage.

## An Answer to a Criticism.

EDITOR OF DENTAL SUMMARY,
Columbus, Ohio.

Dear Sir:

Answering the criticism of Dr. L. E. Edel, of New York, of my paper printed in the December SUMMARY, beg to say that if Dr. Edel will make a careful comparison between my paper and Dr. Emelin's article he will find that there is absolutely nothing to criticise.

Dr. Emelin's article speaks of gases heated to 60 degrees F., while mine refers to gases heated to blood temperature, or about 98 degrees F. I do not consider that gases are heated, in a general sense, if they are not heated above 60 degrees. Anyone who uses gas from a gasometer would always be using gas at a higher temperature than 60 degrees because the gas without being heated would be at least at room temperature, which is about 70 degrees even in very cold weather. During the summer this gasometer gas would at times be at a temperature of close to 90 degrees without heating. On the whole, Dr. Emelin's article and mine are not to be considered from the same standpoint, as he refers to a temperature of 60 degrees, whereas I refer to one of 98 degrees. There is such a vast difference between these two temperatures that I do not feel that Dr. Edel's criticism is apropos.

Respectfully yours,
Val. H. Frederich.

# OBITUARY

## Dr. M. B. Dennis

As briefly announced in our January number, Dr. M. B. Dennis, for many years a successful and popular dentist of Port Huron, Mich., died of pneumonia on December 4, 1912, aged fifty years.

Dr. Dennis was born at New Market, Ontario, Canada, in 1862. Graduated in dentistry at University of Michigan 1883, and shortly thereafter began practice at Port Huron, where he gained not only professional success but a host of friends as well. He was for many years a member of the Michigan State Dental Society, at one time serving as secretary. He served two full terms as member State Board of Dental Examiners.

Dr. Dennis leaves a widow and many sincere friends to mourn his loss.

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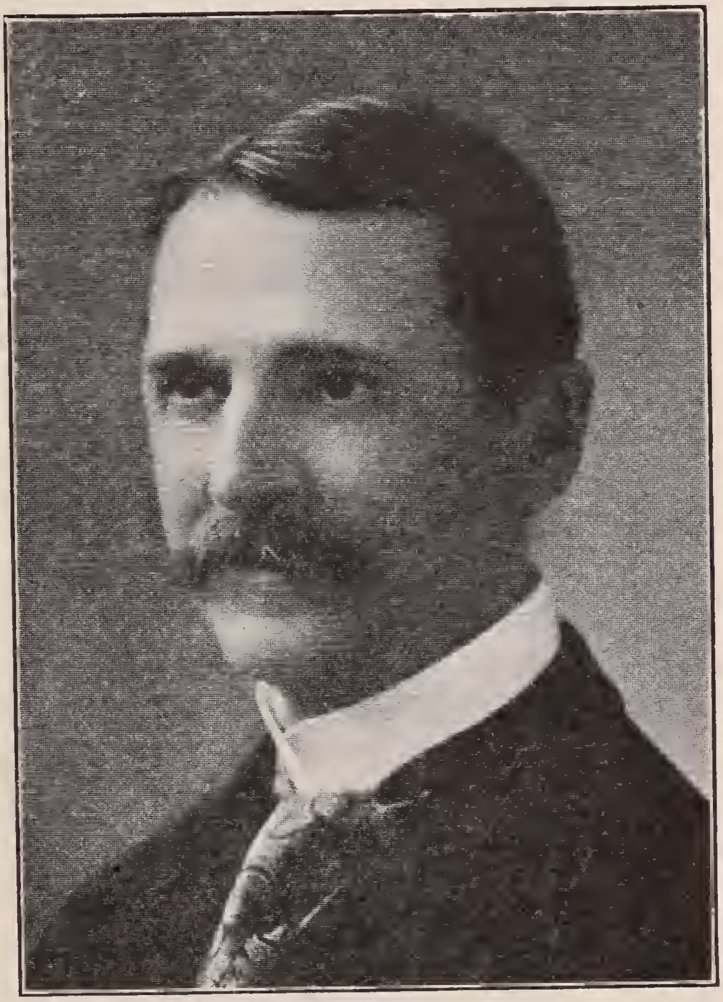
## Wilbur F. Litch, M.D., D.D.S.

It is with regret that we chronicle the death of our esteemed friend and brother editor, Dr. Litch, who died at his home in Philadelphia on December 30th, 1912. Dr. Litch was born in 1840, his father being a Methodist minister.

In 1858 he entered the office of his uncle, Dr. J. M. Barstow, to study dentistry. He graduated from the Pennsylvania College of Dental Surgery, with the degree of D.D.S., in 1861. Following this he spent several years in the private anatomical school of the eminent surgeon, D. Hayes Agnew. In 1865 he graduated from the Jefferson Medical College with the degree of M.D.



Wilbur F. Litch.

He served for several years in the medical department of the U. S. army, and in 1871 he began the practice of dentistry in Philadelphia. In 1878 he was appointed professor of Prosthetic Dentistry and Materia Medica and Therapeutics in the Pennsylvania College of Dental Surgery. He was made Dean of the College in 1899. In this same year he became editor of *The Dental Brief,* which position he held until his death. Dr. Litch contributed to dental literature, his chief work being "The American System of Dentistry" (1888), of which he was editor-in-chief.

Dr. Litch was a member of National Dental Association, Pennsylvania State Dental Society, National Association of Dental Faculties, and The American Medical Association. He was one of the leaders in the profession, a capable editor, and a man that won the esteem and respect of all who knew him.

## Dr. Geo. W. Hill

At Reading, Michigan, Dr. Geo. W. Hill, of cerebral hemorrhage, December 29, 1912, aged 60 years 2 months 18 days. He was one of the most prominent dentists in Hillsdale county, having been a resident in the county seventeen years and a practitioner in Reading for thirty years.

George W. Hill was born in Olean, N. Y., Oct. 11, 1852. When but three years of age his parents moved with him to this township, and he had never moved from the borders of the county since.

On September 26, 1877, he was united in marriage to Miss Margaret I. Norton, of Allen, and one son, Leon L., was born to this union.

Mr. Hill's affliction, that finally led to his death, covers a period of about twenty years, and during this time he has been under the surgeon's knife five times—three times in Chicago, once in New York and once in Detroit—and about seven years ago he suffered a stroke of paralysis from which he was confined only about a week, however.

Mr. Hill was an exemplary citizen and a man of sterling integrity and worth, a loving husband and father, making his home life an ideal one. He was a member of Reading Lodge F. and A. M., the O. E. S. and the Maccabees. He had always been an attendant at the Baptist church, and this winter came out at their meetings and announced his intentions of affiliating in full membership with that society.

## Dr. D. C. Whaley

Dr. D. C. Whaley, one of the oldest dentists in Ohio, died of pneumonia on Monday, December 30, 1912, at his home in Pomeroy. At the time of his death Dr. Whaley was 84 years old. He was the son of James Whaley, a Revolutionary soldier, and was born June 29th, 1828. In 1837 his parents moved to Pomeroy. In his youth the doctor was a carpenter and cabinet maker, and was known as a natural mechanic. When about twenty-one years of age he decided to become a dentist and entered the Ohio College of Dental Surgery at Cincinnati. He also studied medicine with Dr. Vanduyn, of Middleport, and later secured a license for the practice of medicine.

Doctor Whaley began the practice of dentistry in Pomeroy in 1853 and has practiced there ever since. He was active in municipal affairs, having served for a number of years as president of the Board of Trade, and was identified with many of the enterprises of the town. He was well and favorably known throughout Ohio, and a member of the Ohio State Dental Society. He leaves a wife and two daughters.

# SOCIETY

## Examination of Dentists for the U. S. Army

The Surgeon General of the Army announces that examinations for the appointment of Acting Dental Surgeons will be held at Fort Slocum, New York; Columbus Barracks, Ohio; Jefferson Barracks, Missouri; Fort Logan, Colorado, and Fort McDowell, California, on Monday, April 7, 1913.

Application blanks and full information concerning these examinations can be procured by addressing the "Surgeon General, U. S. Army, Washington, D. C."

The essential requirements to securing an invitation are that the applicant shall be a citizen of the United States, shall be between 21 and 27 years of age, a graduate of a dental school legally authorized to confer the degree of D.D.S., and shall be of good moral character and habits.

Acting Dental Surgeons are employed under a three years' contract at the rate of $150.00 per month. They are entitled to traveling allowances in obeying their first orders, in changing stations, and in returning to their homes at termination of service. They also have the privilege of purchasing certain supplies at the Army commissary. After three years' service, if found qualified, they are promoted to the grade of dental surgeon with the rank of first lieutenant, and receive thereafter the pay and allowances appertaining to that rank.

In order to perfect all necessary arrangements for examination, applications must be in the possession of the Surgeon General at least two weeks before the date of examination. Early attention is therefore enjoined upon all intending applicants. There is at present a large number of vacancies to be filled.

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## The Oklahoma State Dental Association's Post Graduate School

(THE DENTAL MEETING THAT IS DIFFERENT FROM OTHERS)

The second annual session of the Oklahoma State Dental Association's Post Graduate School will be held in Oklahoma City March 24, 25, 26, 27, 28 and 29, 1913. The lecturers and demonstrators are to be Dr. Martin Dewey of Kansas City, Mo.: Dr. J. V. Conzett of Dubuque, Iowa, and Dr. Thomas P. Hinman of Atlanta, Ga. The course will consist of about eighteen lectures and many practical demonstrations of the lectures in Operative Dentistry, Prosthetic Dentistry, Orthodontia, and Crown and Bridgework. All ethical dentists are eligible to take the course, and dentists from other states are cordially invited to attend the meeting, but will be expected to pay a membership fee.

For any information address C. R. LAWRENCE,
Enid, Okla.

## Midwinter Meeting of the Rehwinkle Dental Society

The second annual midwinter meeting of the Rehwinkle Dental Society will be held at the Elks' Club, Chillicothe, Ohio, afternoon and evening of February 22, 1913.

At the afternoon session (2:30) there will be a paper by Dr. A. J. Bush, Columbus, and clinics from 4:30 to 5:30. A banquet will be served at the Elks' Club at 6 o'clock.

At the evening session it is expected that Dr. H. B. Tileston of Louisville, Ky., or Dr. J. R. Callahan of Cincinnati will present some subject of special interest to the profession.

Good clinics by prominent dentists are already promised, but the committee will welcome clinics from any dentists who have something to show. All who wish to give clinics should write to Dr. W. G. Hamm, president, Chillicothe, or Dr. H. R. Clark, secretary, Circleville.

Members of any component dental society are urged to meet with us and share the good things planned for the meeting.

W. G. HAMM, *President.*
H. R. CLARK, *Secretary.*

## University of Buffalo, Dental Department.

The fourteenth annual meeting and clinic of the Alumni Association of the Dental Department of the University of Buffalo will be held in the College Building on February 14-15, 1913. An excellent program of essays and clinics has been arranged. Class reunions, fraternity banquets and a general good time is assured. Ethical practitioners are invited to attend.

M. B. ESCHELMAN, *President.*
D. H. McCOY, *Secretary.*

## The First Michigan District Society.

The First District Dental Society will hold their annual clinic and banquet at the Hotel Pontchartrain, Detroit, Mich., on Saturday, February 15th. A hearty invitation is extended to all who can make it convenient to be present. The committee having the matter in charge are sparing no pains to make the meeting a huge success.

Yours very sincerely, EDWIN H. WICKS, *Sec'y.*

# THE DENTAL SUMMARY

The Magazine That Helps

Vol. XXXIII MARCH, 1913 No. 3

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The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

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L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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# REGULAR CONTRIBUTIONS

## THE MANAGEMENT OF CHILDREN UNDER FOURTEEN YEARS OF AGE*

BY JAMES B. LESTER, D.D.S., CHRISTIANBURG, PA.

THE METHODS advocated in this paper are what I have gleaned from various writers on this subject and my personal experience.

I have found that the most important thing to accomplish with children is to gain their confidence. The easiest way that I can do this is to place myself on the level of the child and its interests, keeping well posted on things pertaining to child life in general. Every time an opportunity offers I have a chat with my small patients and prospective ones, taking care to remember their likes and dislikes. In this way, as a rule, we know each other fairly well when the child comes to the office. In this way I have also learned to judge these patients quickly, so if the acquaintance has not been made before the child enters the office it is easily made then.

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*Read before the Virginia State Dental Society, 1912.

After the child is seated I explain what will be necessary to give them relief and why they should care for their teeth. They are assured that they will not be hurt, without being told, and I am careful not to hurt them at the first sitting. Right here let me say, never allow the mother in the operating room while working for a small patient. I have found that one of two bad results accompany her presence there; either the child, when the least pain is caused, will look to her for help, or she will scold when the child objects and want to force submission. I never allow force to be used. The work is done with the patient's consent or not at all. I make it a practice to allow these small patients to watch, in a mirror if they wish, while I apply some palliative treatment. The first sitting I always make as short as possible to prevent tiring the child.

So much for the management of these small patients before the work is begun. I will now take up a few of the cases we have to deal with at this period of life. The temporary incisors and cuspids, I find, do not often need attention. If they decay, where it is superficial, I smooth them off so food will not be retained; where it is deep, I use gutta-percha for filling. I have found, in my short experience, that this material is very satisfactory for filling temporary teeth.

The premolars are the teeth that will need the most attention. It is a lamentable fact that but few of the premolars are in a sound condition when shed. These teeth should be watched carefully and the cavities filled while small. I use copper cement very extensively in this class of cavities, and have very satisfactory results. I sometimes use amalgam, but, as a rule, prefer the cement because of its medicinal properties. But often the child is not brought to us until these teeth are aching. When the decay is removed the pulp is exposed, or, still worse, is dead. In cases of exposure I dress with carbolized resin, and when the child returns, two days later, if there has been no pain I proceed to fill the tooth. I use cotton rolls to keep the cavity dry while I remove the dressing and cap the pulp. For this capping I use thymolized calcium phosphate mixed with oil of cloves. The cavity is then filled with copper cement, or amalgam. Another method which has given very good results in cases of this kind is to use the carbolized resin for capping. Where the pulp is capped, if there is any soreness following the filling, it indicates that the pulp is dead. In that case the filling should be removed and the tooth treated. For this work I use nitrate of silver. Dressing the tooth with it, I allow this dressing to remain two days. It is then removed and renewed. Two days later the tooth is filled, using nitrate of silver in the bottom of the cavity. No effort is made to fill the canals. This method has given splendid results for the past five years. The parent should be told to watch the tooth and, if at the time when it should be shed it does not loosen, to have it extracted. This will usually be necessary, as the roots of these teeth when pulpless are rarely ever absorbed.

If the pulp is putrescent the decay is removed and cresolis or formocresol used to correct this condition. If the roots have not been absorbed I use the formocresol. Only a small quantity of this preparation should be used, as large quantities are likely to cause soreness. Where the roots are absorbed I prefer the cresolis. When the canals are thoroughly cleansed the nitrate of silver is used and the tooth filled as described in the previous case.

This disposes of the temporary teeth. The next thing to need our attention is the first molars. These teeth often decay very early owing to the fact that children do not brush the teeth as they should. In filling these teeth I remove all decay thoroughly from the edge of the cavity; then carefully lift out the decay from the bottom. If this does not expose the pulp, I dry the cavity and place a pellet of cotton moistened with cresolis in it for a few minutes. When this is removed I use cotton rolls to check the saliva and line the cavity with Gilbert's lining. The tooth is then filled with amalgam.

Where the pulp is exposed it is treated with the carbolized resin and capped with thymolized calcium phosphate, as described for the premolars. Where the pulps are capped it is necessary to tell the parent what has been done, and keep a record of the operation. This is necessary because, in some cases these teeth, after several years, give trouble in the form of reflected pain. If you know what has been done it is easier to locate the trouble. Where they do give trouble, which will usually not be for several years, the tooth will be nearer complete, and the pulp can then be removed and the canals filled as in the ordinary case, using care not to force the filling beyond the apex. In case the pulp is putrescent I treat and fill, using the same care as before not to force the filling beyond the apex. In my opinion, these teeth should be saved where possible, if only for a few years, because if they are removed the second and third molars tilt forward and are thus thrown out of the proper occlusal plane. The development of the jaw is also affected by the early loss of these teeth.

The permanent incisors and cuspids are filled with gutta-percha or cement usually until ten or eleven, and after that with gold.

**Everything comes to those who wait,**
**And the lazy man waits to greet it;**
**But success comes on with rapid gait**
**To the fellow who goes to meet it.**

# THE CONDYLE PATH — ITS IMPORTANCE AS A FACTOR IN MASTICATORY EFFORT AND MEANS OF REGISTRATION*

BY JAMES H. PROTHERO, D.D.S., CHICAGO, ILL.

*(Continued from page 150, February Summary)*

## INTRODUCTION OF BASE-PLATES IN THE MOUTH

A number of important details are to be carried out in fitting base-plates in the mouth; the order of carrying them out can be varied somewhat, but the following plan is a convenient and logical one.

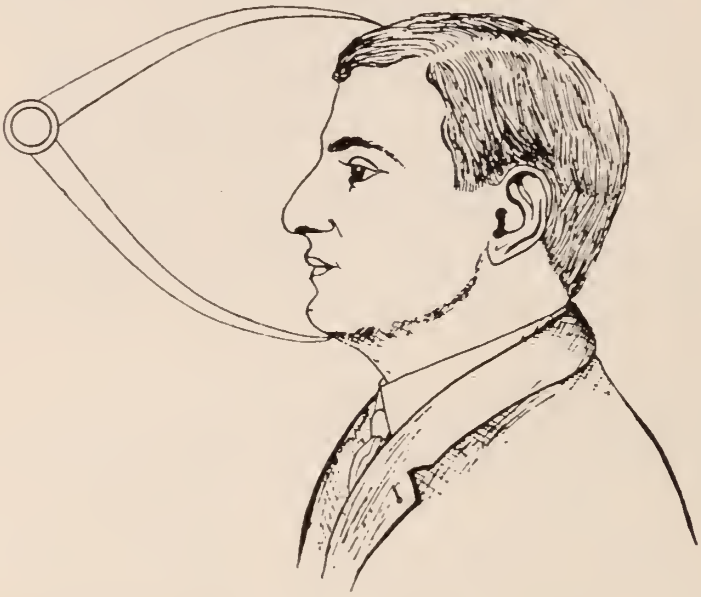

Fig. 8

Fig. 8. Theoretical method of establishing the correct facial profile.

First, establish the correct length of the upper, and height of lower wax rims. By way of illustration, suppose a patient has a full complement of natural teeth, and with these in normal occlusion, the distance between the mentum and some point on the cranium (Fig. 8), which could afterward be located, be recorded, say 8 inches. After a time the patient returns for dentures, having lost the teeth in one or both arches. The rims of wax on the bite-plates should be of such length as to place the mandible in its former position and the calipers, if again applied, should record the same measurement (8 inches) as before. This would result in restoring normal facial profile.

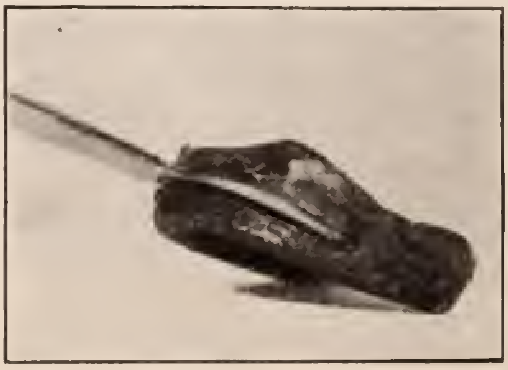

Fig. 9

Fig. 9. Bite stem inserted in upper wax rim.

Since, for obvious reasons, it is not practical to follow out this plan as outlined, the facial profile is determined by observing the position of the lips as they rest against the base-plates. The upper bite rim should usually extend about 1 m.m. below the upper lip when the latter is in a normal state of rest. The lower rim should be of such length that when in contact with the upper, the lower lip may come to its normal position of rest against the upper lip without requiring muscular effort to effect closure. Too short a rim will result in the lips being pursed out, and the perpendicular profile of the whole face abnormally shortened, while on the other hand if the rim be too long, reverse conditions will prevail.

In addition to the details outlined, restoring the general convexity of the face should be carefully worked out. The cuspid eminences should be developed sufficiently to partially, but seldom ever wholly, obliterate the depression extending from the alæ of the nose out over the angles of the mouth. The faces of adults, possessed of their full complement of natural teeth, almost without exception, present a depression in this situation, and sometimes a positive wrinkle is shown, so that to attempt to obliterate the depression entirely will usually result in deforming the features. Proper care bestowed in contouring the wax rims obviates changes and consequent loss of time in subsequent steps, since the contour developed in the wax determines the position of teeth in their respective arches. The high and low lip lines should be marked on the rims to indicate the correct length of teeth appropriate to the case, so that neither too much porcelain nor too broad an expanse of gum will show when the finished denture is introduced in the mouth.

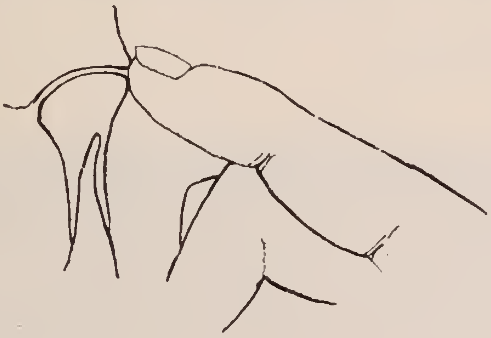

Fig. 10

Fig. 10. Placing the ball of the finger on the glenoid rim and end of the condyle.

The various steps just described, and the taking of the bite which is to follow, precede the application of the face bow, but it is necessary at this time to carry out two steps that are essential to the proper adjustment of the bow. The first step is to remove the upper bite-plate, and after heating the crescent-shaped end of the face bow stem, force it into the wax rim sufficiently deep to secure the two firmly together (Fig. 9). The stem is now removed, as its presence would tend to dislodge the base-plate, while taking the bite, and the upper bite-plate is returned to position in the mouth.

The other step consists in locating the condyle ends, and since this can only be accomplished by noting the movements of the condyles, it must be done before stapling the base-plates together. The condyle ends are usually about 12 m.m. in front of the external auditory meatus, and on a horizontal plane with it. The situation varies slightly, however, in different individuals. The ball of the finger is placed at the point indicated (Fig. 10), and the patient instructed to open and close the mandible slightly a number of times. The upper portion of the ball should rest on the immovable margin of the glenoid fossa, and with care the end of the condyle when in action will be found directly beneath. In some subjects the glenoid rim overhangs the condyle end, and the interposed integument and the adipose tissue is so thickened as to render detection difficult. In such cases, considerable pressure exerted inward and downward, with repeated movements of the mandible, will result in the condyle ends being properly located.

The integument opposite the condyle ends should be dotted with a soft pencil so that later, in adjusting the face bow, their exact location may be found without delay.

### TAKING THE BITE

The most convenient and accurate method of taking the bite consists in instructing the patient to relax the muscles and allow the operator to open and close the mandible at will. The base-plates being in position, and the muscles relaxed, the chin is grasped with the fingers and the mandible opened and closed a number of times, slight pressure being exerted upward and backward to force the condyles into their fossæ. Under repeated manipulation the base-plates will strike in exactly the same place each time.

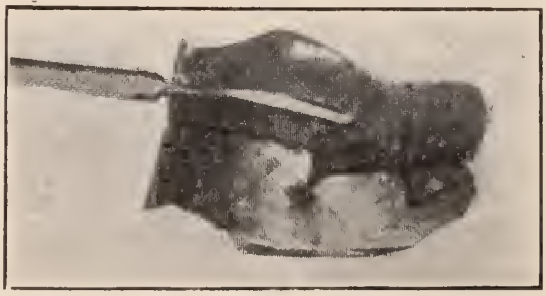

Fig. 11

Fig. 11. Bite-plates stapled together, attached to the bite stem as they appear when removed from the mouth.

When this is determined the patient is instructed to keep the jaw closed while the four pointed staples are forced into the wax rims to hold the base-plates in their true relationship with one another. (Fig. 11.)

### ADJUSTING THE FACE BOW

The stem of the face bow is now returned to the groove previously made for it in the upper wax rim and pressed firmly to place. Sometimes the wax is melted against it to more firmly secure it in place, and plates and face bow during removal from the mouth.

The large central clamp of the face bow is now passed onto the stem and the bow dropped down until the graduated rods are opposite the condyle ends, when they are pressed in until they rest firmly against the points previously dotted (Fig. 12). The bow should be evenly balanced, so that the same number of graduations show between the inner side of each arm and the face. Unequal adjustment of the rods results in the models being thrown off the true median line when mounted on the frame. The clamp nuts on each rod are tightened firmly, after which the central clamp is fixed to the bite stem, which completely establishes the correct relationship between the alveolar borders and condyles. The side clamps are now loosened, and the patient instructed to open the mouth. By

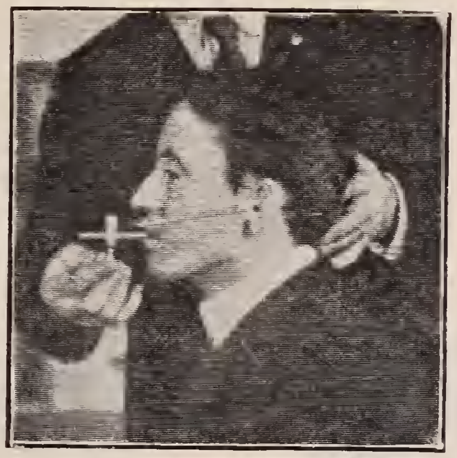

Fig. 12.

Fig. 12. Adjusting the face bow. Tightening the bite clamp.

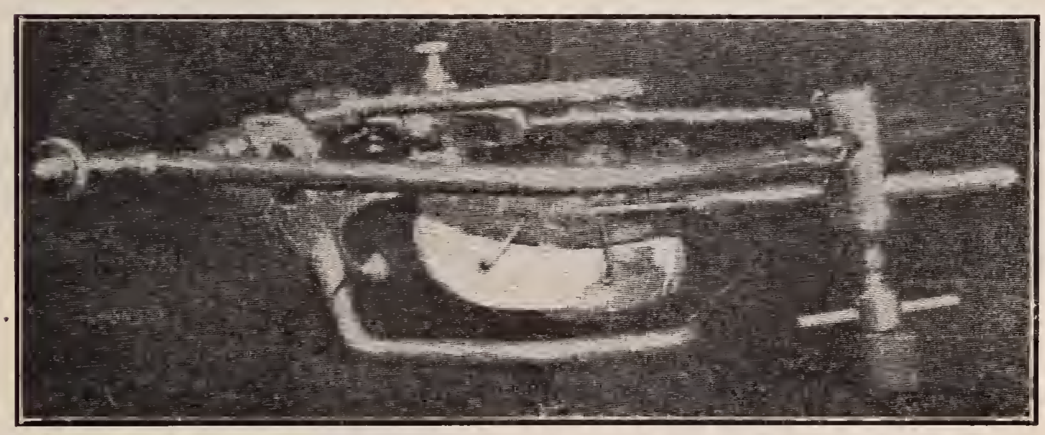

Fig. 13

Fig. 13. Face bow carrying bite-plate adjusted to frame.

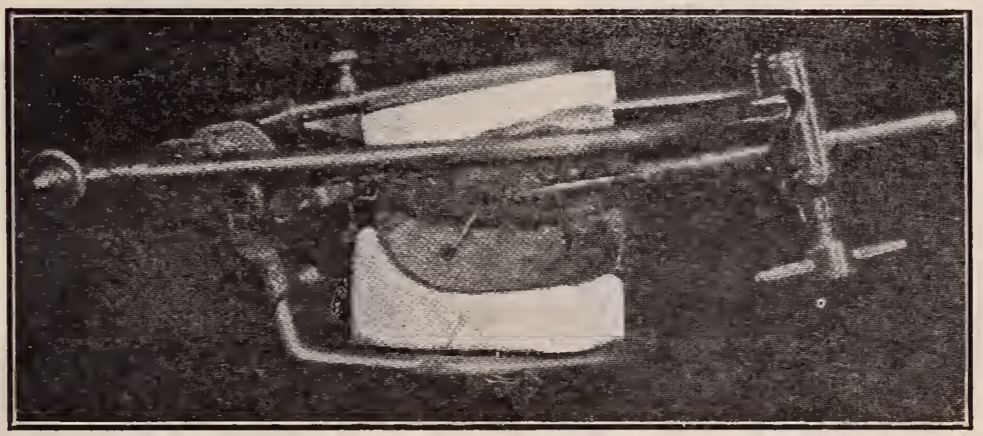

Fig. 14

Fig. 14. Models adjusted in base plates ready for mounting to frame.

grasping the bite stem firmly, the base-plates are removed from the mouth, usually without difficulty.

### MOUNTING MODELS ON THE OCCLUDING FRAME

The graduated rods are next thrust in to their full extent and the clamps tightened. This brings them in correct position for engaging with the projecting ends of the frame hinges to which they are now adjusted (Fig. 13), the bite-plates being between the upper and lower bows of the frame. The upper bow is thrown back, the upper model placed in its base-plate and firmly seated, the bow dropped down upon it, and plaster applied in the usual manner for attaching the two together. When set, the frame is inverted and the lower model attached in a similar manner (Fig. 14), after which the face bow and stem are removed (Fig. 15). This completes the mounting of the models on the occluding frame.

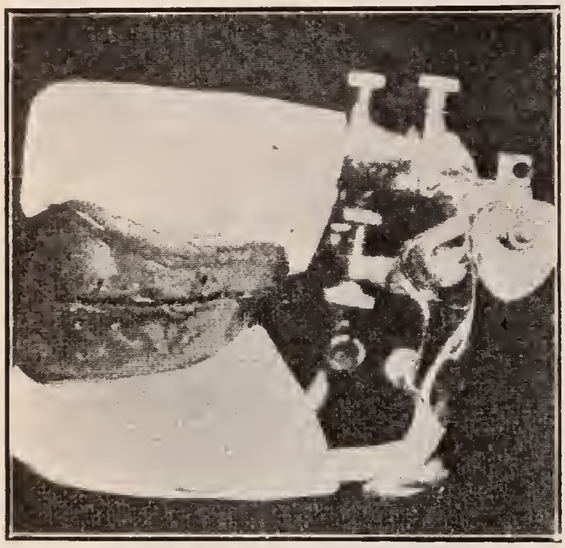

Fig. 15

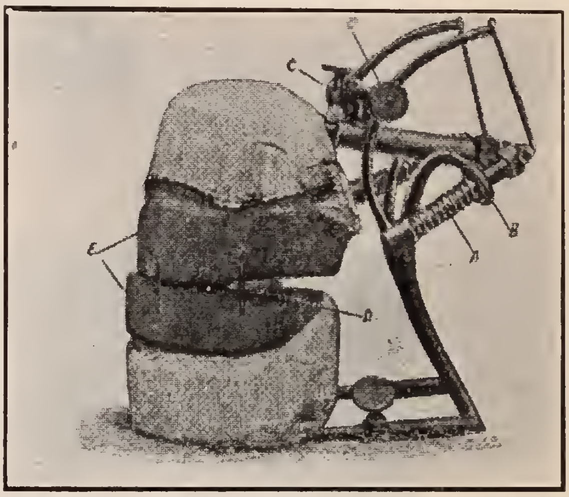

Fig. 16

Fig. 15. Models attached and face bow removed.
Fig. 16. Christensen's method of registering the condyle path.

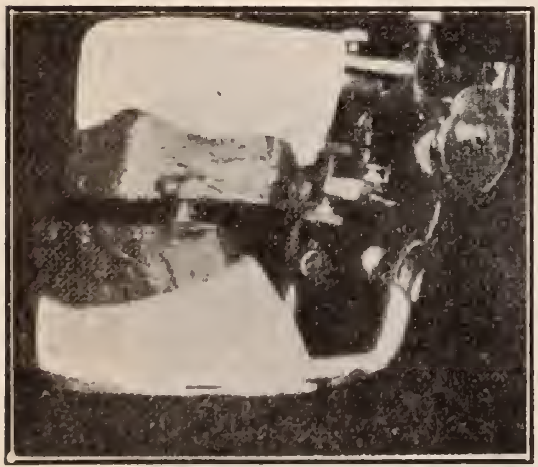

Fig. 17

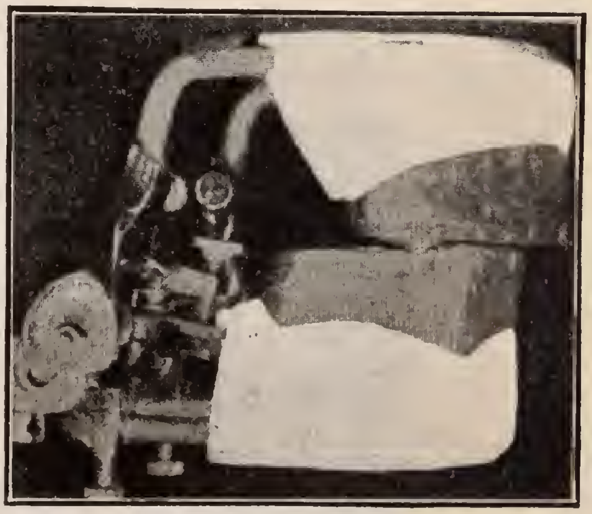

Fig. 18

Figs. 17 and 18. Substituting the Snow bite gauges for the rolls of wax.

### RECORDING THE CONDYLE PATH

The case is now ready for recording the condyle path and setting the condyle paths of the frame to correspond with those of the patient.

The Christensen method of carrying out this step consists in returning the base-plates to the mouth and taking a *protrusive bite, i. e.,* having the patient protrude the lower jaw and close in the protruded position. (Fig. 16.)

Previous to closing the mouth as just designated, rolls of wax are placed between the rims on both sides in the first molar region, and as the patient closes the interposed wax forces each base-plate firmly against its border and maintains the space outline formed between the distal portions of the base-plates, due to the dropping downward of the condyle in its path. The base-plates anteriorly should be in contact, the lower one being protruded. This relationship is securely maintained by applying the four-pointed staples previously mentioned. The Snow bite gauges are now generally used instead of the rolls of wax, as they prevent the tendency of the base-plates to slide out of correct relation in removal from the mouth. (Figs. 17 and 18.) The clamps controlling the condyle paths of the frame are loosened, and the back spring unhooked, which gives the models a wide range of movement.

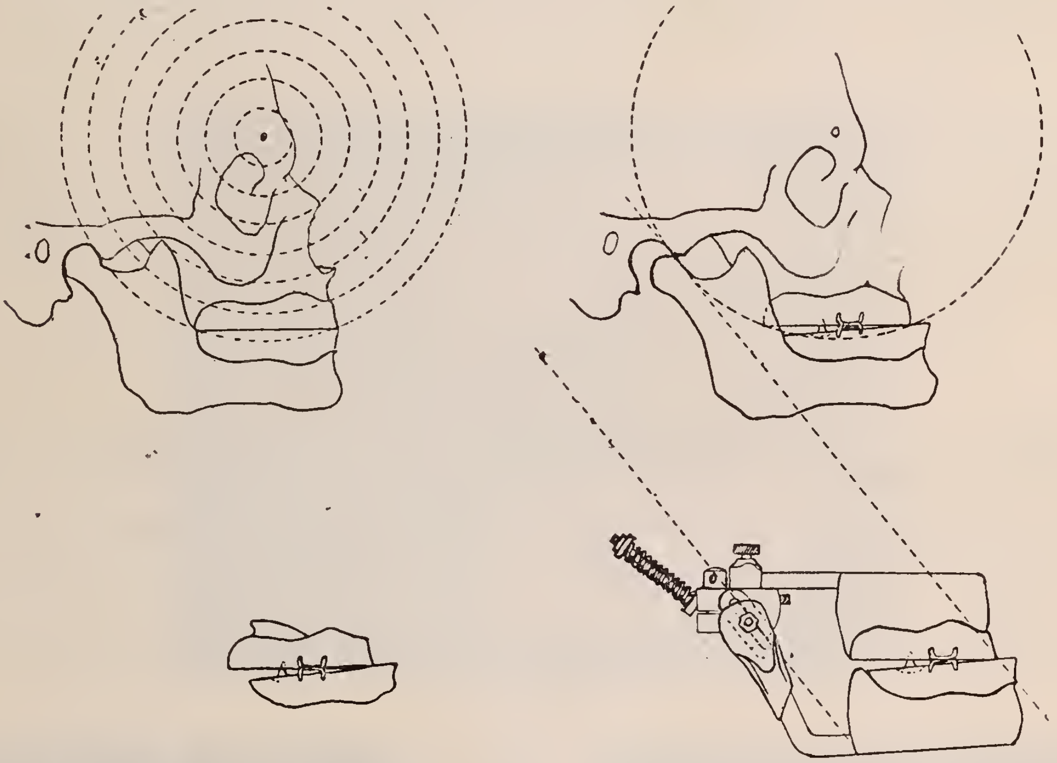

Fig. 19

**Fig. 19.** Scheme illustrating the relationship of the base-plates in their normal and protruded positions, the removal of the base-plates from the mouth and their return to the models. Note the parallel relation between the condyle path in the upper right figure and the condyle slots of the frame.

The base-plates, still in their protruded relation and firmly attached together, are now carried to place, the lower one being accurately adjusted to its model. The upper model is now moved backward and gently, but firmly, seated in its base-plate. If the slots of the frame are observed during this step, they will be seen to assume various positions, but as the upper model comes to rest in its base-plate, the slots or paths will take the same angular inclination that the condyle heads traverse in producing the protrusive bite. (Fig. 19.)

The clamp nuts controlling the condyle slots are now tightened, the staples and bite gauges removed, and the back spring again connected, which brings the models in the same relation to each other as when first mounted, the only change effected by this step being to adjust the condyle paths to meet the requirements of that particular case.

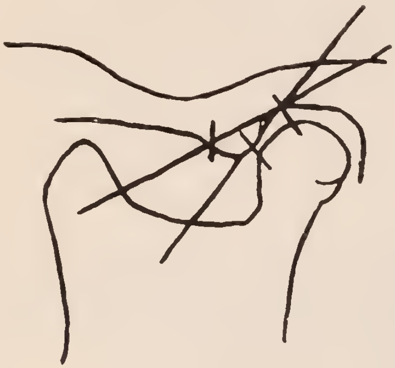

Fig. 20

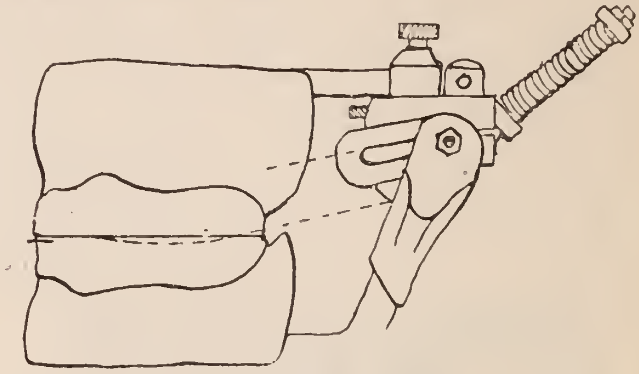

Fig. 21

Fig. 20. Diagram showing two possible condyle registrations in the same individual, the less inclined and longer one being produced by an excessive protrusion, and consequently is incorrect. The steeper path represents more nearly the limit of travel of the condyle head in normal masticatory effort, and is obtained by having the patient protrude the mandible about 5 m.m. in taking the protrusive bite.

Fig. 21. Shows curve marked on lower wax, afterwards to be sliced off.

### THE WAX PLANES SO AS TO COORDINATE WITH CONDYLE CORRECTING MOVEMENTS

Since the condyle path is a fixed quantity and establishes a definite line of movement in the human masticatory machine, and since the wax rims serve as guides in arranging the teeth—not only labially and buccally, but occlusally as well—it is necessary now to modify the flat wax bite planes to coordinate with the line of movement of the condyles in their paths. This is done by outlining on the buccal surfaces of the lower wax rim a curve running from about the position the cuspid will occupy to the distal ends of the rims. (Figs. 20 and 21.)

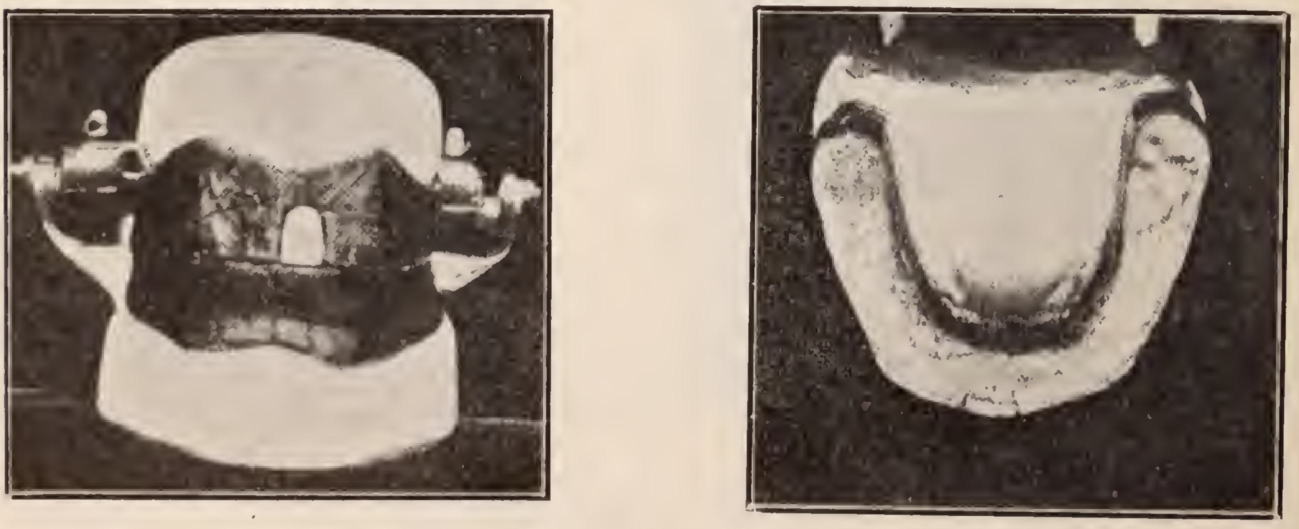

Fig. 22 Fig. 23

Figs. 22 and 23. Labial and incisal view of the first central incisor in position.

The curve should be so formed that if extended backward it will be coincident or parallel with the condyle path of the frame, as the conditions of the case demand. The curve having been outlined, a sharp knife is used to slice off the wax along the line indicated. (Fig. 21.) It should be sliced off with a single cut, if possible, and transferred to the upper base-plate directly opposite, and there attached with a hot spatula. The spherical form of the upper and lower arches should be borne in mind, and the curve developed—not only from before backward as described, but from side to side as well. Both sides having been treated in this manner, the correctness of the work is tested by subjecting the rims to the protrusive and lateral frame movements. This will disclose any existing errors, and, if present, they can easily be corrected by trimming, or additions of wax here and there, as may be needed. The base-plates when trimmed should maintain contact throughout their entire occlusal and incisal areas in both lateral and protrusive movements, and when so formed they serve as accurate incisal and occlusal guides in arranging the teeth. Pulverized soapstone applied to the contact surfaces of the rims is a decided help in the final trimming and adjusting, as it prevents the two rims from sticking together, and enables the various movements to be carried out with ease.

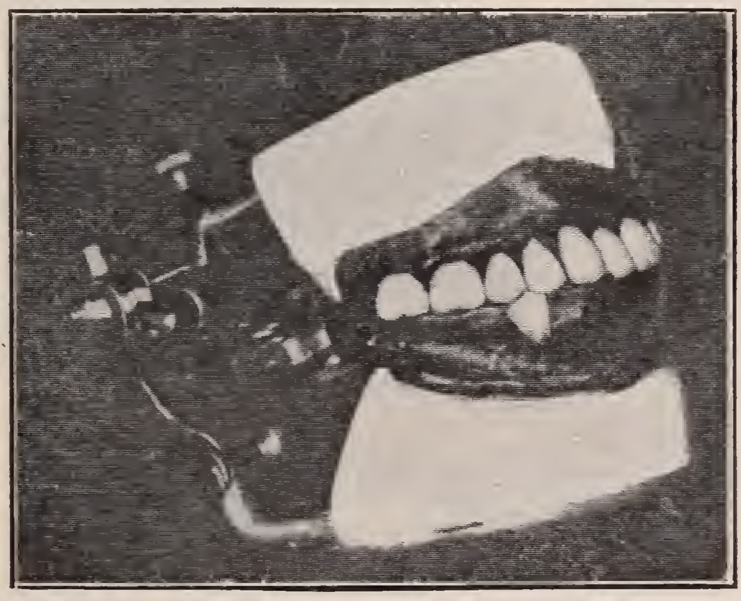

Fig. 24

Fig. 24. Placing the first tooth in the lower arch.

### ARRANGING THE TEETH

The teeth are arranged on the upper base-plate first. A space of sufficient length, width, and depth to receive a central incisor is formed by removing the wax, and the tooth placed in position (Figs. 22 and 23), its incisal edge and labial contour coinciding with these surfaces of the wax rim. The wax is then melted around the pins to hold it in position. Another section of wax is then removed and another tooth placed in position, the tooth last set and the undisturbed wax rim serving as guides in its arrangement. Each tooth is adjusted in this manner until the entire fourteen are in position.

The lower second bicuspid is set in position first (Fig. 24), because less grinding will be required, and better occlusal areas can be secured by so doing than when the arrangement is begun at the median line. The molars and first bicuspids are then adjusted, then the cuspids, laterals and centrals are placed. Should the six anterior teeth be much too wide or too narrow to fill the space between the two first bicuspids, others should be selected. If only a slight disproportion exists, it may be corrected by grinding the distal sides of the cuspids and the mesial sides of the first bicuspids of the teeth in one or the other of the arches, depending on the character of the disproportion.

As each tooth in the lower arch is set, the accuracy of its position and occlusal relations should be tested by subjecting it to lateral and protrusive movement.

Before beginning the arrangement of the teeth, the central grooves of all of the bicuspids and molars should be broadened buccally and lingually, and as a result in the general adjustment only slight modification will be necessary. Again, after the dentures are inserted in the mouth, by the use of carbon paper, the high points can be located and easily reduced, thereby clearing away the minute high points of contact not discernible to the eye. This procedure can be carried out to advantage in all cases of full upper and lower dentures, whether constructed by this or any other system. In other words, regrinding clears the paths of the cusps, so that the lateral movements can be accomplished more smoothly, and the occlusal surfaces of all the bicuspids and molars interlocked more closely than they otherwise would were this process neglected.

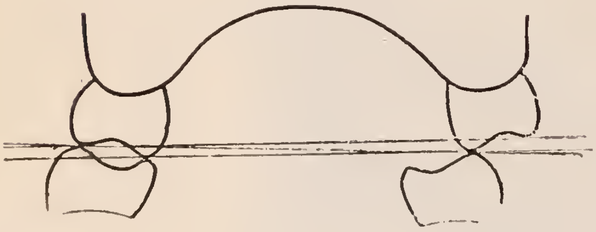

Fig. 25

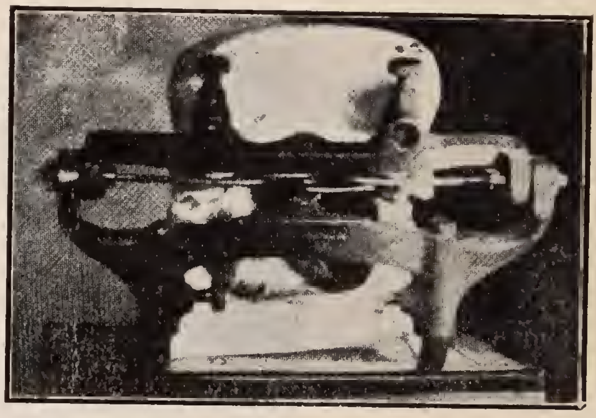

Fig. 26

Figs. 25 and 26. Contact of the buccal and lingual marginal ridges of the teeth on the working side of the mouth. Right side shows balancing contact.

The fact should be kept in mind that contact is desirable and necessary along the entire line of buccal and lingual marginal ridges of the bicuspids and molars on the working side of the mouth, while there should be no contact from the cuspid on this side to the opposite second molar on the balancing side. There the disto-buccal cusp of the lower second molar should be so placed that it will find ready contact with the mesio-lingual cusp of the upper second molar, in order to establish balancing contact (Figs. 25 and 26; see also Figs. 27, 28 and 29). The plan followed by some, of arranging the teeth in all cases on a flat plane, and securing the balancing point by tipping the last molars slightly forward, while productive of good masticatory results, involves as much effort in arrangement, and in the opinion of the writer is frequently lacking in esthetic effects.

### THE GYSI METHOD OF REGISTRATION

Dr. Alfred Gysi has designed a registering device consisting of a bar, at right angles to which are attached two adjustable arms, each carrying a pencil point. In adjusting the bar, which is attached to the lower biteplate, the pencils are set opposite the condyle ends and rest against cards held in contact with the face.

In mandibular movements, the pencils record the exact path taken by the condyle in forward and protrusive movements. From the record thus obtained, slotted templets corresponding to the condyle paths are selected and placed in the joints of the occluding frame, thus reproducing the essential movements necessary to establish coordination. The appliance can also be used as a face bow for mounting models correctly on the frame. The research work of Gysi, together with the improved appliances which he has produced, indicate substantial scientific advancement in the field of prosthesis, and brings it nearer to that desirable stage of perfection, where the greatest beneficial results will follow remedial efforts in prosthetic procedures.

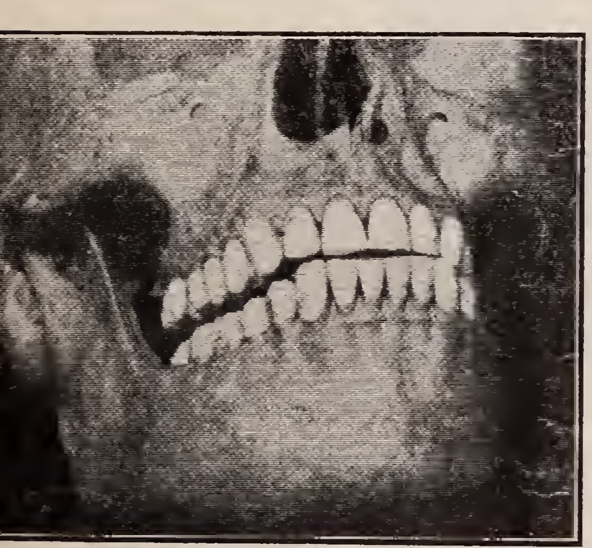

Fig. 27

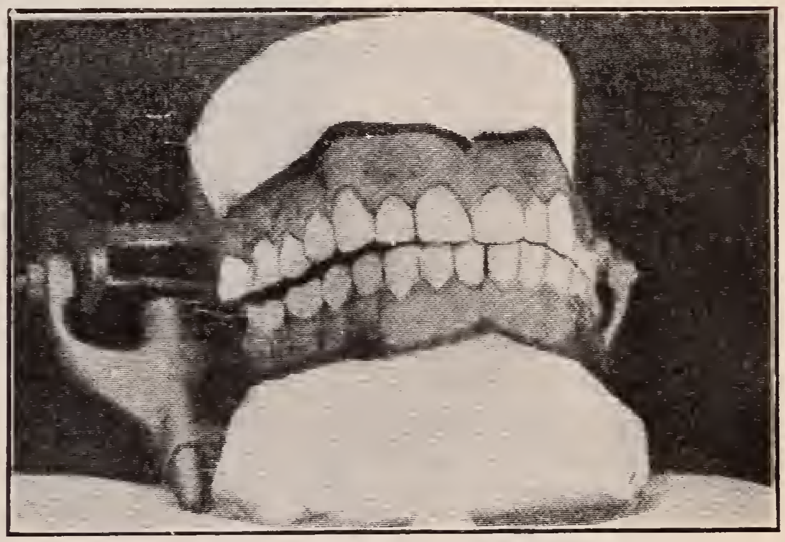

Fig. 28

Figs. 27 and 28. Note the broken contact in both natural and artificial teeth on the balancing side of the mouth until the last molars above and below find contact on account of their occlusal surfaces being parallel with the line of movement of the condyles.

### ADVANTAGES OF ANATOMICAL OCCLUSION

The value of the system of occluding teeth anatomically as followed at the present time, has been proven beyond question. In most cases patients for whom substitutes are constructed by this method are able to masticate efficiently on first trial, because by the very nature of their arrangement, the teeth glide in normal paths without interference, while the dentures as a whole sustain each other in normal position in masticatory effort, due to the development of the balancing points of contact, which prevent the tipping of the dentures. While it is true that more time is required, and possibly greater care exercised, in following the method outlined than is usually devoted to procedures of this class, on the other hand, much greater benefit accrues to the patient, and consequently a fee commensurate with the service rendered can be charged. In addition to the advantages mentioned, the fact that service rendered of the character described represents the highest type of scientific prosthetic art, and this should in itself be an incentive to every practitioner to familiarize himself with, and become proficient in, the methods under consideration.

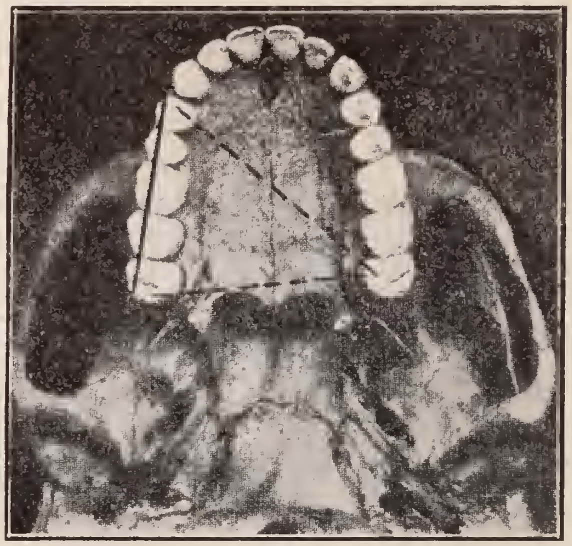

Fig. 29

Fig. 29. Diagram illustrating what is meant by "three point contact." The black line of base of the triangle represents the working side of the mouth and on which there are many points of contact between the upper and lower bicuspids and molars, while the apex of the triangle represents the balancing point of contact.

## USE TWO SPATULAS

BY FRANK G. SWARTZ, D.D.S., CROSWELL, MICH.

If you do not use two spatulas in waxing up a case, you do not know how much time you are wasting. Have one heating while you are using the other. Try it.

## ORAL SURGERY: SELECTED CASES FROM PRACTICE*

BY C. H. OAKMAN, D.D.S., DETROIT, MICH.

The first case was one of tuberculosis, in which the disease entered the system by way of a diseased tooth, showing plainly how tuberculosis can enter the system via decayed teeth. The next was the treatment of a case of neuritis of tri-facial nerve by the injection method of alcohol and cocain. This was done when the patient was nine years of age, following a temperature of from 99° to 101° for six weeks. She is now eighteen years of age and in perfect health.

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*Given as a clinic at Michigan State Dental Society, 1912.

# VACCINE THERAPY FOR PYORRHEA*

BY G. D. LAYMON, D.D.S., INDIANAPOLIS, IND.

IN TAKING up this subject I hardly know where to begin, what to say, and where to stop, because I feel that the field is unlimited and unending, and I do not wish to confine myself entirely to pyorrhea autogenous vaccine work. In order for you to understand how vaccine work is used in the treatment of this disease, it will be necessary to discuss some of the underlying principles of vaccine therapy in general. I have not come before you as a scientific research man, but as a practical one. I have been doing vaccine work for the past three and one-half years and have not been dealing so much with the isolation of the particular organism concerned in this disease, as I have been with the treatment and the administrations of certain vaccines in this work. I know that we have had and do have good men in this work that have done a great deal of research work, Dr. Hartzell, Dr. Goadby, Dr. Abbott, and a few others, but I have found that their investigations have been more or less in the isolation of the principal organism of this disease. Now, it does not seem to me that it makes any difference what organism we use in the treatment of this disease, but it does make a difference as to the results.

So it is like the story of the two fellows who were arguing about whether or not it was correct English to say that the hen set or the hen sat. They argued about it and could not come to any definite conclusion, and one of the fellows finally said, "Oh, well, it does not make any difference to me whether the hen sat or set, what I want to know is whether, when she cackles, she laid or lied." So it is with this.

The first part of my paper will deal more or less with the etiology of pyorrhea. Now, I did not come over from Indianapolis to quarrel about the etiology of pyorrhea, because anyone who has made a careful study of this disease has a right to express his opinion concerning the etiology.

Every one who has made a careful study of this disease or this condition of the oral cavity has a right to express his belief regarding its origin, since the etiology has not been definitely determined.

In discussing the etiology of pyorrhea let us take up the external causes or predisposing causes.

Anything which tends to injure the soft tissues, or irritate them or interfere with their function, may constitute a predisposing cause. Any traumatic injury which interferes with the cell function of the tissue may lower the vitality of such tissue and lead to a weakened condition and allow an infection. This traumatic injury may be brought about by careless use of ligatures, blows or calcareous deposits.

It is not the chemical composition of such deposits that causes the infection of the gum tissue, but it is due to the constant mechanical irritation of the hard deposit, and the pressure incident to the accumulation of the deposit layer by layer, until the soft tissues are forced away from the necks of the teeth, hence nutrition and circulation are disturbed; the resistance of the tissues are so lowered that the pathogenic organisms of the mouth are allowed to overcome Nature and infection takes place. This is allowed to progress and spread until the infection reaches the interdental spaces and the alveolus is even injured and caused to atrophy. Salivary calculus has a very decided predisposition in the etiology of pyorrhea, and its removal in every case is necessary; however, there have been cases under my observation which showed a great amount of salivary calculus and yet no inflammation or pyorrhea. I think the answer for this will be found in the character of the gum tissue. There is no doubt that the resistance of the tissue has a great deal to do with the progress, and even the beginning, of disease, not only in diseases of the oral cavity but in all pathological conditions of any tissue. The character of tissue may be hereditary, as is demonstrated in this very disease under discussion. It seems that pyorrhea more or less is found in members of the same family, demonstrating the fact that parents may transmit weakened tissues to their offspring. But it is probable that pyorrhea would not ensue unless the lesion is established by some traumatic cause, no difference how low the resistance of the tissues may be. But when the lesion is once established the tissues give way and pathogenic organisms enter.

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Malnutrition or faulty metabolism may be a predisposing cause of pyorrhea, or vice versa. Pyorrhea may be a case of faulty metabolism. A patient constantly swallowing amounts of pus, certainly some part of their anatomy will suffer. The end products of bacteria, if sufficiently great, cause toxemia, and even if the by-products are not so great as to cause any immediate danger, the body suffers an unnecessary injury.

In cases where the individual possesses a gouty diathesis, or is a victim to arthritis, the deposits are of serumal or sanguinary tartar. Dr. Edward C. Kirk says: "Their mode of formation is explainable upon the same basis as the calcic formations that are found in old abscessed cavities in other tissues of the body, notably in the lung, lymphatic glands, etc. Deposition of urates in the selected area is followed by localized cell irritation and limited cell death, and the disturbed area constitutes a locus minoris resistance, in which infection takes place and suppurative phenomena already described follow. The close relationship of arthritic malnutrition to pyorrhea involvement of the retentive tissue of the teeth is now clearly recognized, and the constitutional predisposition induced by arthritism to bacterial invasion is found to be dependent upon diminished tissue resistance with lowering of the opsonic index, which in many cases is amendable to autogenous vaccine therapy, under which treatment the opsonic index has been raised to normal with cure of the local lesion."

Malnutrition or faulty metabolism may be a predisposing cause of pyorrhea in that the resistance of the body is lowered and the tissue not only of the oral cavity but the tissues in general may be invaded with bacterial organisms, and infection take place; in fact, any constitutional disease may be classed as a predisposing cause. And this cause is not necessarily calculus; it can be anything that will cause a broken gingiva. It may be, as Dr. Kirk says, "a shell or banded crown which is a physical insult," or it can be caused by lack of contact point in fillings or any mechanical traumatism which may injure the soft tissues. Certainly pyorrhea does not follow in every case where the gingiva is broken, neither does it follow that every infection is pyorrhea. In some cases where salivary calculus has packed the gum tissue away from the teeth, you will find on removing this, the gum to be red and inflamed, probably a slight formation of pus and exudate; however, the infection is superficial and the health of the tissues beneath is not disturbed. The natural resistance of the tissue is sufficient to act as a barrier against the invading organisms, and hence the infection is limited to the outer surface of the mucous membrane. In other individuals the infection seems to begin with the slightest provocation, and spreads rapidly to the surrounding tissues; pus is found deeply seated beneath the gum margin, and pyorrheal pockets are formed near the apex of the roots of the teeth. The cause of difference in the spreading of the infection in these cases is to be found in the difference of the natural resistance of the individual to this particular organism of infection.

The terms "calculus" and "pyorrhea" are no longer recognized as synonymous, as it is a thoroughly demonstrated fact that one may exist without the other.

Many specialists on pyorrhea believe the disease to be one of local conditions due to calculus, malocclusion, filth, etc.; hence the natural sequence of treatment was prophylactic measures, and by so doing the disease would be cured.

Scientific investigation has proven these beliefs untrue, and we no longer doubt that pyorrhea is a symptom of some constitutional disorder. It may be associated with such diseases as leukemia, arthritism, diabetes, tuberculosis, syphilis, etc. In fact, any prolonged disease which lowers the resistance of the body, may constitute a predisposing cause of pyorrhea. Individuals suffering from such disorders are prone to pyorrhea from the fact that their opsonic index is so lowered that nature fails in combating the micro-organisms and infection of the peridental membrane takes place, and since the nutritional sources of the tissues are below normal and the natural defensive forces are below par, the pericementum is invaded by pathogenic bacteria. I wish to quote from Kirk's text-book on *Operative Dentistry*, page 495, in regard to the path of infection: "The path of infection is in all probability along the network of cells described by Black as the "glands of peridental membrane" (see page 475), and who found in the microscopic examination of a tooth extracted from a patient suffering from "phagedenic pericementitis" (the type of pyorrheal inflammation here under consideration) "that some of the lymphatics near the gingivinal border of the membrane were in a state of suppuration." This condition followed the lymph chain in the direction of the apex of the root to a distance which the author says surprised him, "considering the very slight signs of the disease before the removal of the tooth, and seemed especially confined to these cells." He says, further: "This case hints quite strongly that these lymphatics are the seat of this very peculiar infection."

The infection now spreads to the alveolus and also to the gingival tissue. The spongy construction of the alveolus affords a convenient bursa for the multiplication of the micro-organisms, and an osteoclastic destruction of the alveolar bone takes place, as well as a constant atrophy and destruction of the gingivinal tissue, resulting in a complete exfoliation of the teeth located at this region.

A. Hopewell-Smith (*Dental Cosmos,* page 408, April) says: "The disease of the bone is not in its earlier stages a rarifying osteitis. It is essentially dependent upon an osseous lesion, an atrophy of the bone which, in the thinnest parts, causes the cervical margins of the teeth to become denuded through the *halisteresis* and osteoclastic absorption. The presence of serumal calculus is not sufficient in itself to induce the condition, and may not be associated with it at all as a predisposing or exciting cause."

Inflammation of the gingivinal and surrounding tissues is followed by a slow necrosis and atrophy. The progress of the disease depends on a number of conditions:

1. The virulence of the organism. A staphylococcus which has lost its activity or its power of doing injury, causes very little inflammation, perhaps only a slight congestion is noticed, the tissues are able to cope with the invading micro-organisms; but if the staphylococcus is of a higher virulence the tissues become intensely congested, which is manifested by hemorrhage, necrosis and purulency.

2. Natural immunity of the individual has a great influence on infection. Individuals of high resistance to a particular organism destroy the bacteria by the process of phagocytosis, while in other individuals of low resistance the activity of phagocytic power of the polymorphonuclear leucocytes is deficient.

In one case the microbes seem to attract the leucocytes, while in other instances the leucocytes are not influenced, and are actually repelled by the micro-organism.

*Chemotaxis.* "Pickett's and Dick's Infection, Immunity and Serum Therapy."

"The phenomenon of living cells moving toward or away from certain other cells is an expression of affinity, and this attraction is known as chemotaxis. There is somewhat a general law, but one to which exceptions exist, that regardless of the organism present, the more acute the inflammatory process the more polymorphonuclear leucocytes are attracted to the site of infection, and the more chronic the inflammation the fewer the polymorphonuclear leucocytes and the mononuclear leucocytes predominated. It thus appears that in chronic inflammations or cases of chronic conditions that the immunity-producing apparatus needs to be stimulated to more work, as the natural immunizing processes in these cases are too sluggish to stop or prevent the infection from spreading. Under such conditions vaccines are indicated, since they stimulate the opsonic power of the blood, resulting in a materially increased phagocytosis. It is also found that when a sufficient number of previously sterilized bacteria are injected subcutaneously in suspension, the immunizing power of blood is aroused, producing more opsonins and likewise resulting in an increased phagocytosis.''

Through the development of bacteriology we have been able to work out the cause of disease and the nature of the immunizing mechanism, thus teaching us how to take advantage of Nature's immunizing process and to apply it as a phophylactor and curative agent. For a long time the white blood corpuscle, termed phagocytes, have been considered the soldiery of the body, guarding it against invading disease germs. Nevertheless, a baffling fact is yet to be explained, and that is, why these phagocytes frequently fail in their office of physiological defense when most needed. It now appears that their success depends largely upon the presence in the blood serum of a bacteriotropic substance termed opsonin (Latin, *opsons*, ''I prepare the food for''). These opsonins act upon the invading organisms in such a way as to render them an easy prey to the phagocytes. It was this phagocytic power of the blood, as demonstrated in the incubated tube, that led Wright to make extensive investigations as to the opsonic power of the blood in man under various conditions. A measurement of this power he calls the ''opsonic index.''

The term ''vaccine'' applies primarily to the refined virus from bovines, employed in the vaccination against smallpox, in which, by inoculating the body with a weakened and harmless form of vaccine, the vital forces are put on guard and the defense made ready against the real smallpox.

However, we use the term vaccine now to include a suspension of killed bacteria, previously sterilized in any suitable liquid, such as normal salt solution. And it is in this form which vaccines will be considered.

Each disease-breeding micro-organism elaborates a distinct poison or toxin, which in turn brings on its own particular disease. An effectual defense may be developed in the blood under given conditions, anti-toxins, which apparently have power of neutralizing or nullifying these various toxins. These reactionary products may be utilized to protect man from infection. In other words, immunity to certain diseases in conferred by the previous injection of the blood serum of animals already immunized. Further, it has been found that serum is not only a preventive of diseases, but also a curative agent. From painstaking observations, biologic therapeutics has been built up which, though far from being complete, goes farther than all else in medicine to make an exact science.

Just how these protective elements which we call anti-toxins are formed in the blood and tissue juices, their chemical nature, and how they really accomplish their work, we have yet to learn. But we are learning rapidly. The darkness is slowly but surely being illumined. To-day we are ready to believe the words of the immortal Pasteur: "It is possible for man to eradicate every contagious disease from the face of the earth." And now that the opsonins loom up in the distance, we are encouraged more than ever to explore beyond. After all, it is to the autoprotective resources of the organism that we have to look for a scientific therapy. (Parke Davis Co.)

The question is naturally asked: How can killed sterilized bacteria injected subcutaneously immunize? What effect can the dead carcasses of bacteria have on the living organisms of the tissue? This immunizing process is more or less a difficult problem, and probably not definitely settled, but the theory advanced by Sir A. E. Wright is generally accepted. By means of the opsonic index it has been proven conclusively that during immunization Nature automatically increases the opsonic power of the blood which causes an increase of phagocytic power of the polymorphonuclear leucocytes. Wright also demonstrated by taking the opsonic index at short intervals that when killed sterilized bacteria were injected subcutaneously the power of the blood was aroused, producing more opsonins, thereby increasing phagocytosis. This is indicated by an increase in the number of germs microscopically observed to be enclosed or engulfed by the phagocytes in a given volume of blood in the patient after the vaccine has been administered.

The opsonins in the blood serum determine the issue of the contest. The demonstrated fact that killed cultures of germs are capable of raising the opsonic index is the ground upon which is based the therapeutic use of bacterial vaccines.

Since the introduction of biologic therapeutics there has been a great expectancy, and never has the future been more promising. By the term biologic therapeutics we mean the use of biologic products as remedial agents, chiefly the products of bacterial life and the reactionary products developed in the blood of animals infected with bacteria or their toxins. (Parke Davis Co.)

## VACCINE THERAPY IN DENTISTRY.

Medical journals contain reports of many cases treated by "Biologic Therapeutics," and the almost miraculous results obtained in smallpox, carbuncles, acne, empyema, cerebro-spinal meningitis, diphtheria, septicemia and kindred affections that have been treated successfully by appropriate vaccines. Results have been obtained in medicine by the proper use of vaccines, then why not in dentistry? There is no reason why dentists should not use vaccines, if they are willing to qualify for such work. Medical men who have given time to the study of "Bacterial Vaccines" have proven, as is shown by their reports in medical journals, the use of these vaccines in the treatment of infections both acute and chronic.

The infections with which the dentists have to deal are usually caused by staphylococci or streptococci. Sir A. E. Wright determined by a series of experiments that the phagocytic powers were relatively diminished toward these micro-organisms, but could be specifically increased by the subcutaneous injection of killed bacteria.

The work of Wright has been confirmed by many medical men, and it also has been shown "that the staphylococci and streptococci have a power of resisting the anti-bacterial activities of the body. (Ricketts and Dicks.)

It is upon these established facts we base our theory of vaccine therapy in the treatment of pyorrhea.

John Osborne Polak, of Long Island Hospital, Brooklyn, N. Y., says: "We have been using vaccines for the last three years, and have been able to keep a close observation of cases treated by this method. So many professional men speak of vaccine therapy, only to condemn it as useless and unnecessary, that many of the profession, instead of giving it the full clinical value, have come to look upon it as a fad of the laboratory experimenter. It is only by the reports of those of us who have had considerable experience in the use of bacterial vaccines checked by the proper blood examination before and after each injection, that reliable data can be amassed. Our experience convinces us that, while it is a mistake to imagine that we have in bacterial vaccines a panacea for all infections, it is conclusively proven that vaccine therapy has a place and serves a distinct purpose as an adjunct to the established forms of treatment.

"When the human organism attempts to overcome an infection, the battle against the bacteria and their toxins is waged by Nature, by the production of substances in the serum of the normal blood, known as bactericidal substances, that kill the products of the bacteria. These are also present in the blood opsonins, which combine with the bacteria themselves and so alter them that the phagocytes can destroy them, and finally, the human organism further protects itself by the elaboration in the blood-stream of certain anti-toxins, specific anti-bodies, which combine with and neutralize the toxins. The staphylococcus and streptococcus are little, if at all, affected in their activity by the bactericidal substances, but are readily opsonized and ingested by the phagocytes. Consequently, if we are to carry out the processes of Nature in combating local or general infection, it is necessary to increase the phagocytes, for phagocytosis is one of the cardinal factors in producing an artificial immunity. This can be done by bacterial vaccines. It is when the process is local that most can be expected from vaccine therapy.

"Instead of taking opsonic index, a very simple method is to make blood-counts and estimate the polynuclear percentage before and after the injection. It is best to examine the blood from four to six hours before injection is made; then give comparatively small doses, 25,000,000 to 100,000,000, and eight hours later re-examine the blood. This shows us whether or not the dose given has been sufficient to change the leucocyte-count; if it has not made any change, the injection is repeated on the next day in larger dosage; if, on the other hand, there has been any change in the polynuclear percentage, we wait for the beginning of the negative phase before repeating the injection, and when it is repeated the dose is doubled. In mixed infections an initial dose of 100,000,000 to 250,000,000, as a hyper-bacteriemnia, resulting from the patient's incompetence to produce his own anti-bodies, is less liable to occur when the infecting organisms are of low or of mixed variety.''

As is shown by the foregoing experiments, nature can be assisted materially by the subcutaneous injection of killed bacteria in cases of staphylococci or streptococci infections.

Pyorrhea, in the opinion of the writer, based on a microscopical examination of more than one hundred cases, is an infection of the staphylococci pyogenes albus, or a modification of the aureus.

Autogenous vaccine from each case is prepared and subcutaneous injection administered in the thick part of the arm half way between elbow and shoulder, preferably on the outer surface of the arm. The initial dose ranges from 100,000,000 to 300,000,000 killed bacteria, depending upon the physical condition of the patient. The inoculations are continued at intervals of from three to seven days, with an increased dosage depending upon the clinical observation of the patient. The idea is to gradually raise the opsonic index of the patient with respect to the infecting organism.

Autogenous vaccines are far better than stock vaccines in many ways.

1st. Autogenous vaccines conform to the particular organism or organisms producing the infection.

2d. Autogenous vaccines contain the organism or organisms in their respective proportions and degree of virulence.

3d. Autogenous vaccines are far more scientific, as their preparation will enable one to use them more intelligently.

The degree of success in vaccine therapy will depend upon,

1. Securing the proper organism or organisms.
2. Standardization of bacterial suspension.
3. Emulsification of prepared vaccine.
4. Sterilization of bacterins.
5. Initial inoculation.
6. Clinical observation.
7. Spacing of dose.

I inject a number of bacteria beneath the skin in the arm, say a hundred million; I tell the patient that he will probably suffer from a slight headache or nausea, and he will ache and hurt, etc., and then in twelve to twenty-four hours we will have a red indurated area, varying from the size of a dollar to an area covering the arm from the elbow to the shoulder, depending on the virulence of the organism used and the physical condition of the patient. When the inflammation has subsided I will probably give the same dose again, and work my way from the initial dose up until I can give large doses of that particular vaccine, without causing any local or general reaction.

I would like to speak a few words about immunity. I have been asked a great many times how long the immunity would last in the case of using vaccines. Now, immunity explains the fact by which the human mechanism resists disease. We may have a natural immunity which is manifested in certain animals such as the dog and some of the wild animals; these are immune to syphilis and different venereal diseases. The black race is immune to yellow fever and susceptible to tuberculosis. Algerian sheep are immune to anthrax, while others are susceptible. Then we have an acquired immunity; this may be produced in several different ways. It may be divided into active and passive immunity. By active immunity we mean that the blood takes an active part in producing the immunity. This is accomplished by the injection of attenuated cultures of bacteria. By attenuated cultures I mean that the virulence of the culture has been reduced. We have passive immunity; this is accomplished by the injection of anti-bodies directly into the system. The blood does not have any activity in producing anti-bodies. In other words, we use the immunized serum of an animal, thus producing a passive immunity. As I said before, in my three and a half years' experience in doing vaccine work in pyorrhea, I have found that 98 per cent. of the cases yielded to staphylococcus vaccine.

Just one word before I take up the chart, and that is to make you clear upon the different kinds of staphylococcus. It is a very common organism, and is found in the air, dust, on the skin, beneath the nails, and so on. This kind of staphylococcus is merely a harmless suprophytes. The size of the staphylococcus varies from 7-10 to 9-10 microns. They stain with any of the simple aniline dyes.

### CULTURAL CHARACTERISTICS.

The staphylococcus organism will grow luxuriously upon most all culture media, suitable for the growth of bacteria, but it prefers a culture media of alkaline reaction. I use agar agar No. 4 of Parke Davis, and on that we will find that we will have a luxurious growth in from twelve to twenty-four hours. It appears in glistening white globules slightly raised from the surface, and does not liquefy the agar agar, while the growth upon gelatin is distinguished by the liquefaction of the gelatin.

*Pigment Formation.* I am sure you are all familiar with staphylococcus pyogenes aureus and albus.

*Resistance.* The staphylococcus organism seems to be more resistant than the other members of this family, and repeated freezing does not kill the organism. It will live for two or three months dried upon paper, and in a culture tube two or three months without being transferred to a new culture tube. It takes about 56 degrees centigrade to destroy it, exposed for thirty minutes. But we find that this varies.

*Pathogenicity.* By this we mean the power of causing disease. This varies with the virulence of the organism, as I explained to you awhile ago about the different staphylococci. It also depends upon the resistance of the animal or individual.

*Ferments.* It has been found that the staphylococci organism has a power of secreting certain ferments, as has been demonstrated by their growth upon gelatin, a ferment which breaks up fats and a tryptic ferment which breaks up albumens. The staphylotoxin, which has the power of producing haemolysis in the body; by this is meant the dissolving of the red part of the blood cells and setting it free. It also produces another toxic product known as leucocydin, which has the power of dissolving cell nuclei, thus destroying the leucocytes.

## DISCUSSION

DR. M. H. FLETCHER, Cincinnati: This subject is exceedingly interesting and of vital importance to us, but it has been my misfortune not to have seen Dr. Laymon's paper.

It is far from my wish to condemn any procedure, in the treatment of diseases, which I think could be of benefit. The fine essay which Dr. Laymon has given us is of value to anyone practicing the healing art where autogenous therapy is demanded. But I wish to differ with him when he claims that the diseases of the gums and sockets, commonly known as pyorrhea, are amenable to vaccine treatment, claiming, as I understand, that the disease is (with local manifestations) systemic in its origin. My experience would lead me to think exactly the opposite.

As to the autogenous therapy, as far as I know all the vaccine preparations being successfully used are those in which there is a definite infection which produces a definite systemic disorder, and the serum used is made from this particular germ. The disease under discussion starts from local lesions. These lesions become infected by many varieties of organisms. Systemic disorders may be the result of the extension of these local lesions. The systemic features of the disease may be caused by pathogenic germs flowing into the system from a diseased mouth.

The essayist claims that local manifestations are the conditions where vaccine treatment is most desirable. I doubt it. Looking over the history of vaccine therapy we find where it has been most successful and adopted has been in those diseases which are caused by definite and distinct organisms, and that the vaccines used have been made from these special germs, and when thus used they tend to cure the disease the germs originally caused. Hence the name Autogenesis. Such vaccines or serums are now kept in stock and are known as stock vaccines. It is very likely, as the essayist has stated, that freshly prepared vaccines are better than stock vaccines.

When it comes to treating a disease with vaccine therapy, which disease is of local origin, with systemic manifestations due to the disease, I take direct issue with the essayist on its reasonableness.

The systemic disorders accompanying alveolitis (so-called pyorrhea) seem to be secondary to the disease and a direct result of the local lesions and the accompanying sepsis of the mouth. On this point I would call your attention to an article on

''Oral Sepsis'' by Dr. William Hunter, of London, whose latest essay on Oral Sepsis, as you know, was greatly garbled in *Current Literature* some months ago and has been severely criticized because it was so maligned. Taking the whole article, it is fair, just and to the point. I believe in what Dr. Hunter has said on the subject. I have observed many diseases which I thought came from oral sepsis, yet when I read Dr. Hunter's articles I find I had barely looked in at the window, as it were.

In order to put the matter plainly before you, if I may be permitted, I will read some quotations from Dr. Hunter which were used in a paper read last week before the Stomatological Section of the American Medical Association.

To assume, as I understand the essayist does, that serum therapy will control the mouth conditions portrayed by Dr. Hunter seems very unreasonable to me. I will admit that the opsonic index may be raised by serum therapy, as claimed by the essayist, but it can be more safely raised by the administration of quinine or other remedies such as nux vomica, arsenic, etc.

This paper of Dr. Hunter's is entitled ''The Role of Oral Sepsis and of Antisepsis in Medicine,'' and is an address delivered at the opening session of the faculty of McGill University at Montreal. He says under ''Oral Sepsis'':

''In the foregoing sketch of the chief spheres of the doctor's interest, I omitted any reference to one other portion of the body which constantly comes under his observation, indeed more often than any other—I mean the mouth. This omission was intentional on my part. The cases presently to be described—which could be multiplied by thousands and tens of thousands coming under the daily notice of doctors—illustrate how constant this omission is in practice.

''The chief feature of this particular oral sepsis is that the whole of it is swallowed or absorbed into the lymphatics and blood. Unlike the sepsis of open wounds on the outside of the body none of it is got rid of by free discharge on the surface. The effects of it, therefore, fall in the first place upon the whole of the alimentary tract from the tonsils downwards. These effects include every degree and variety of tonsilitis and pharyngitis; of gastric trouble from functional dyspepsia up to gastritis and gastric ulcer; and every degree and variety of enteritis and colitis, and troubles in adjacent parts—e. g., appendicitis. The effects fall, in the second place, upon the glands (adenitis), on the blood (septic anaemia, purpura, fever, septicemia), on the joints (arthritis), on the kidneys (nephritis), on the nervous system.''

''The subject of 'oral sepsis,' as I designated and defined it, namely, the septic lesions of streptococcal and staphylococcal infection found in the mouth, belongs to no one department of medicine or surgery. It is common ground on which the general doctor, physician or surgeon; the throat, nose and ear and eye specialist; specialists in children's diseases, in stomach diseases, in blood diseases, in 'rheumatic' diseases, in fevers, in skin diseases, in nervous and mental disease, and lastly, the dental surgeon, all meet on terms of equal responsibility. In its earliest manifestations no special knowledge is required to deal with it; a sound grasp of the principles underlying antisepsis alone is required. Unfortunately for the patient, it is precisely this grasp which, I grieve to say, is wanting.''

This, I think, is a good criticism of the attempt to use vaccine therapy for a disease which originates locally and becomes intensified by infections of many varieties, but not of one which could be cultivated and inoculated to produce the disease, or one that could be made into a serum which could relieve the disease or keep the patient immune from future attacks.

To finish the quotations from Dr. Hunter:

''I submit, then, once more, as I did in the first communication (1900) bearing the title of 'Oral Sepsis,' that in the interests of the many sufferers from the great group of medical affections which it produces, this condition of oral sepsis, the chief channel of access of all pyogenic affections, is urgently deserving of increased notice and attention. Knowing, as we do, the pathogenic qualities of staphylococci and streptococci, we have not the slightest excuse for allowing the mouth, so easily accessible to local measures, to remain the chief seat of open wounds and a veritable hotbed for their development and propagation.''

It seems to me that oral sepsis, as a source of bodily disease, should be more forcibly impressed upon us than it has ever been. The subject is now attracting the attention of the medical and surgical professions. It is also being worked at in a mild way by many of the dental professions, but I believe its full import is comprehended by very few.

Our friend Dr. Talbot, of Chicago, you know, lays great stress on arterio-sclerosis, and all that goes with it, as the cause of diseases of the gums and sockets. This is, to me, just as far out of the way as serum therapy for its treatment. He and I have discussed it by the hour.

My own conception of the disease is that when it has once taken strong hold locally it produces systemic disorders, which in turn increase the local disorders, and thus the two, working each into the other, form what is known as ''the vicious circle,'' which condition reduces the opsonic index to a very low point. Not only this, the general health may go down and lead finally to death.

I wish to compliment the essayist on presenting what I consider an excellent paper on the subject of general serum therapy, but I cannot see that he has presented any light on its value as a therapeutic agent in the treatment of diseases of the gums and sockets.

Dr. Geo. B. Harris, Detroit: I would first like to take issue with Dr. Fletcher on the origin of Pyorrhea. Certainly, Pyorrhea will always be found in the mouth. The same kind of an infection, I mean one caused by the same organism or organisms, would be called by a different name to designate the locality or nature of the infection. Also we will always find Appendicitis in the Appendix. Like disturbances in another part of the body would be known by a different name. This fact does not or is it any proof that Appendicitis is wholly and always of local origin, however. The predisposing cause of Appendicitis may be grape seeds. In a case of Appendicitis caused in this manner, the seeds would come wholly outside of the Appendix and certainly would not be of local origin. So it is with Pyorrhea. The fact that Pyorrhea is always found in the mouth does not prove that it is of local origin any more than the fact that appendicitis is always found in the appendix proves that appendicitis is always the result of a local condition.

If it were possible to remove all infectious conditions in cases of Pyorrhea and maintain an aseptic field until recovery could take place, local treatment alone could cure Pyorrhea, but as we carry in as many germs almost as we remove while scaling the teeth, it becomes impossible to produce an aseptic field, let alone maintain one.

One point I wish to bring out which the essayist has referred to, is that not every infection found in the gums is Pyorrhea. There certainly are infections sometimes found in the gums that can be cured by local treatment alone. However, there are also conditions that local treatment, while they help, cannot produce an absolute, or in most cases, no cure at all. It is these conditions that the vaccine treatment overcome in most cases; and it was these conditions that the essayist, no doubt, had in mind when preparing his paper. The term Pyorrhea is at times applied to every affliction the gums can possibly fall heir to. It is used by the dental profession much the same as the term cold is used by the medical. The term Pyorrhea is made to cover far too much ground, and conditions absolutely different are often brought together and made to roost under the same roof.

The essayist has carefully outlined the manner in which vaccines bring about their results and the reasons for their employment. He uses a salt solution in making his vaccines. While that is commonly used, I prefer plain sterile water. The reason I use the water instead of the salt solution is because of the tendency of the former to precipitate salt crystals, which also appear illuminated when using the ultra con-denser. Further, experiments do not show any advantages the salt solution would have over the water in the preparation of emulsions. An emulsion heated at 60 degrees will kill all the bacteria, and I see no reason why the tube should be opened to make the test to find out if the bacteria are all killed, as the essayist does. Experiments show that the staphylococcus are all killed by heating the emulsion for an hour at 58 degrees, and these vaccines were found to have an increased potency of from 5 to 15 per cent over those heated at 60 degrees. Further, it has been found, by experiments, that a one-tenth of one per cent tricresol will kill the staphylococcus within a few hours, and vaccines thus made had an increased potency over those heated of over 30 per cent.

I would advise against using a cu. mm. as the amount of liquid used at a dose. I use a cu. cc. The increased amount of liquid does not increase the amount of pain when injected, and the dose will be found to be a great deal more accurate.

Bacterial vaccines are harmless if properly used. Let me quote Professor Leary of Boston: "Through error, 10 c.c. of Staphylococcus Pyogens Aureus vaccine, containing 10,000,000,000 organisms, were injected at one time as the initial dose. In one case no untoward symptoms appeared. In the second there was a temporary collapse, with prompt response to heat and stimulation. These doses were ten times the maximum and were given as the initial dose. If ten times the maximum dose of cocaine were used in these cases, instead of vaccine, I wonder if there could not have been something more than just one collapse? If I were to ask how many of you were using vaccines at the present time, not many would answer "yes"; but if I were to say that most of you were using them and have been using them for some time, you would not believe me. Nevertheless, most of you are using them, unknowingly, with various degrees of success. You are using them, not in a sterile solution and accurate doses, but you are using them just the same.

Experiments with guinea pigs infected with staphylococcus albus obtained from patients afflicted with pyorrhea, have shown that the opsonic index can be raised a great deal by simply massaging the infected area. It has also been found that massaging the gums of the patient will result in a sudden raise of the opsonic index and a resulting decrease in the amount of pus produced. When you massage the gums of your patient, or when your instrument slips, producing a laceration, a certain amount of bacteria are carried in with a resulting raise of resistive power to that organism or organisms. The amount of immunity possible to be obtained by this means is not known at the present time, but experiments now under way will, when completed, show to what extent the opsonic index can be raised in this manner. In such cases the massage causes a setting free of germs from the inflamed gums which act as an auto-inoculation.

Stock vaccines do not give the same response as do the Autogenous. There are several reasons why this is true, which I will not discuss at the present time. There are many local infections, such as furuncles, that respond readily to treatment by stock vaccines. When stock vaccines are used in the treatment of Pyorrhea, however, there is seldom much benefit resulting; although at times they prove beneficial. Why this should be so has been very interesting to me, and some experiments have shown some interesting results. Cultures of Staphylococcus Albus obtained from sources other than the mouth, and cultures obtained from patients suffering from Pyorrhea were incubated at the same time. The cultures obtained from the mouth did not develop as rapidly and were found to be much more difficult to remove from the agar than the other. Upon making vaccines from the two, it was discovered that the cultures obtained from other sources would separate much more quickly, when put in the centrifuge, than the mouth cultures would. The tenaciousness of the mouth cultures was found to be much greater than the other cultures in every way. Live cultures of the two injected into guinea pigs showed that the mouth cultures were not as virulent as the others; also vaccines from the mouth cultures could be used in much larger doses before a reaction would result. As a result of these experiments, I believe the cultures to be an attenuated form of the true Albus, possibly the Staphylococcus Epidermides Albus, which is considered to be an attenuated form of Albus. Causes that might produce an attenuated form are lack of favorable conditions, such as a constant change of temperature and changes in the chemical composition of the saliva. Further, experiments have shown that after a certain degree of immunity has been obtained by the use of Albus vaccine, cultures obtained from the gums and Staphylococcus Albus were injected into different guinea pigs. While both cultures gained a foothold, the mouth cultures were more rapid. Repeated experiments showed the same result. While the difference was not great, there was a noticeable difference in each case. There are a variety of other experiments that might be cited to explain why stock vaccines have little effect when used in the treatment of Pyorrhea, but I will not take the time to discuss them here.

There are associated conditions sometimes present with Pyorrhea which are often overlooked or are treated as a distinct and separate condition. I will cite a few cases from practice that will show some of these conditions:

CASE 1.—Mrs. H. Treated locally for Pyorrhea for eleven years. When I first saw this case, three years ago, I found the teeth all loose; there was no inflammation in the gums, due to the systematic local treatment she had received. Very little pus could be discovered; likely due to its constant removal. The patient was continually having trouble with her eyes during the time she had been afflicted with Pyorrhea and was treated for this trouble during the same length of time, with nothing more than temporary relief. Five months ago vaccine treatment for the Pyorrhea was decided upon. An abscess had formed over the root of the second molar on the lingual side. This was lanced and a portion of the pus collected, incubated, and vaccine made from it. Two injections of 70,000,000 were given one week apart. The first injection gave a reaction in the form of a chill, the second was followed by a flow of pus from the eyes. Another injection of 100,000,000 followed. The pus discharge from the eyes ceased. An examination of the eyes by the specialist reported them to be in very good condition and permitted the patient to discontinue wearing glasses. The teeth are in very good condition, while they are still quite loose, and no granulations have yet been discovered, there is every indication that this will take place and the teeth become firmly attached to the alveolus. That there was close association between the Pyorrhea and the trouble in the eyes is obvious. The question arises, however, which caused the other? Was the infection in the eye caused by the Pyorrhea or vice versa?

CASE 2.—Mr. F. Treated for neuralgia for over a year. He was referred to me by his physician about five months ago. An examination showed him to be suffering from Pyorrhea. There was a constant discharge from the gums. He complained of shooting pains that started from various points along the alveolus, traversing along the path of the trifacial nerve, terminating generally over the eye. The teeth were carefully scaled and an autogenous vaccine made. An injection of 400,000,000 given. A reaction followed the first injection. Within forty-eight hours the shooting pains ceased and have never returned. One week later another dose of 400,000,000 was given. This also was followed by a reaction, which was not as severe as the first and did not last as long. A marked decrease in the amount of pus followed. Patient able to use his teeth for masticating purposes without any pain. The inflammation in the gums increased slightly following the first injection, returning to normal, two days after the second injection of 200,000,000 continued one week apart. Following these injections, the flow of pus ceased entirely. The treatment was continued every seven days, the dose varying from 200,000,000 to 400,000,000, depending on the condition of the patient. While there are no signs of granulation to date, there is every indication that it will soon appear. This patient received his first injection at a clinic given during the Michigan State Dental convention, April 12, 1912, and there has not been time enough for granulation to take place in sufficient amount to be detectable. In this case improvement has been most rapid, and complete recovery should take place.

Case 3—Miss K. In this case there was a pus discharge from the central and laterals alone. Lower teeth and gums inflamed, but no pus discharge. No calculus detected and teeth tight with the exception of the right lateral upper. Culture showed Albus infection. Autogenous vaccine was made and injections of 200,000,000, 300,000,000, 200,000,000 and 400,000,000, given at intervals of one week. A reaction followed the second injection, pus discharge ceased. All inflammation disappeared after the first injection. Opsonic index showed a very high index to albus following the fourth injection. The treatment was discontinued and the patient was dismissed. This may not have been a true case of Pyorrhea; certainly it would have become such had it been allowed to continue. This patient was constantly having colds, appetite very poor, and her condition generally poor. She had a cold at the time treatment commenced, which disappeared after the first injection. As a result of the treatment her appetite has been very good. To put it in her own words, "I am another person," best expresses the results. This case was far from being of entirely local origin, and local treatment could not possibly have produced these beneficial results.

Dr. Laymon (closing): I had quite a few things jotted down here to reply to. I would like to give reply to Dr. Fletcher in saying that the results were obtained with vaccine therapy where the infection was more or less of a general nature. I made a remark that vaccine therapy was best adapted to localized troubles, and I am here to back that statement up. Dr. A. E. Wright classifies disease in three different ways: one, he says, is a disease which is shut off from the general system; another, are those diseases which are loosely shut off from the general system; and another where the infection reaches the blood. He also says that the best results are obtained in vaccine therapy in those cases where the infection is loosely shut off or entirely shut off—localized. Why? Because in the local infections the toxines or toxic products of the bacteria are not allowed to get into the general system to stimulate phagocytosis, but by vaccine therapy we stimulate the system and produce an artificial active immunity. In pyorrhea, if the toxic products do get into the system, it is in such a small amount and so slowly that the system is not stimulated sufficiently to overcome the infection.

In regard to the different drugs which cause an increase of the opsonic index, that is true, but what is the use of giving the patient bitter doses of quinine, strychnine, etc., when you can get it painlessly from doses of vaccine?

Probably if those gentlemen who made replies to this paper had spent as much time in working out the treatment of pyorrhea along vaccine lines, they would come to a different conclusion. In order to understand vaccine therapy you must get into the field and personally carry out the work. Standing off and looking, it seems like a great big bugbear, but it is not. The only way for us to appreciate the value of vaccine therapy in pyorrhea is to do vaccine therapy, and then you will be able to criticize the method.

I wish to make myself clear. I am not claiming that the injection of vaccine cleans out the pus pockets, dissolves the calculus, etc. That is absurd. Use prophylactic measures, keep the mouth clean, and then use the vaccine in connection. It would be foolish for the surgeon to treat an abscess or boil with the vaccine therapy without opening the abscess. It is the same thing in pyorrhea. It is nothing more than an adjunct, gentlemen. If you will use it you will see the results yourself. The results come very plainly, and you can see them with your own eyes.

You, gentlemen, have been treating pyorrhea for a number of years, and I think you will agree that there are a great many causes of pyorrhea. When you have the resistance of the patient run down so low that you have an infection of the mouth and have pyorrhea, you may use all the local treatment you care to in these cases and you will find that you will not get permanent results, or even any results at all. I do not use vaccines in every case. I am treating pyorrhea with prophylaxis. In those cases that are stubborn and you cannot get results, use the vaccine along with prophylactic measures and you will find that your time of treatment will be shortened at least one-half. I am not claiming that it is a panacea for all diseases of that kind.

In regard to your question, Dr. Ebersole, about the specific organism, it has been found that it is not necessary to have a specific organism in the treatment of different diseases by vaccine. Of course it is necessary, in certain diseases, to have a specific organism. Tuberculosis is being treated with autogenous vaccine. In your tubercular infections you find that it is the mixed infections that tear down the tissues. So physicians are using vaccines not with specific organisms, but autogenous vaccine made up from the sputum of the patient. In pyorrhea we do not have any specific organism, neither do we in furunculosis carbuncles, boils and so on, and yet physicians are treating these conditions with autogenous vaccine.

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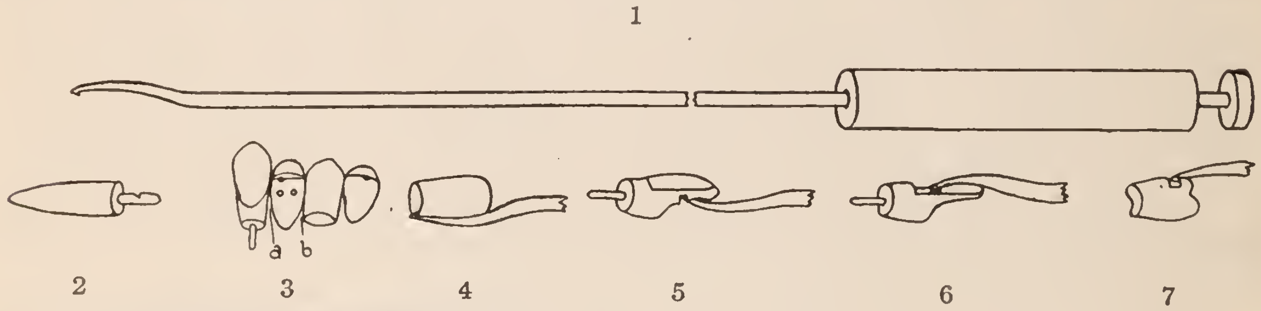
## A CROWN REMOVER*

BY L. L. SHEFFIELD, D.D.S., TOLEDO, O.

This instrument consists of a long shaft on one end of which is riveted a nut. On the other end is a curve with a small hook. On the long portion of shaft is a plunger, which is used as a hammer by striking it against the nut while the end with the hook is under the edge of a crown. This may be used for removing bridges, Richmond crowns, gold shell crowns, Logan post when porcelain has been broken off.

For removing Richmond crowns with porcelain facings in good condition, with inverted cone in right angle, cut groove in backing large enough to admit the hook on crown remover, and by moderate but persistent rapping, the crown can be removed.



1. Diagram of Crown Remover.
2. Platinum Post.
3. Richmond Crown, Bicuspid Dummy with broken facing, Shell Crown and Bicuspid Dummy.
7. Groove in Shell Crown.

Gold shell crowns that fit closely to root beneath the gum line: make groove with inverted cone bur just to the gingival of the reinforced cusp and insert point of crown remover.

For removing Logan crown posts, cut notch in post and insert the instrument, and a few sharp raps with plunger will usually result in the removal of the post. For bridges where facings are broken off from bicuspid or molar dummies, insert hook of instrument to the gingival of the cusp where facing is missing; if close to a crown, it can be removed.

In attempting to remove a well-fitting Richmond crown use moderate force in striking, but be persistent, it will do the work.

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*Clinic at Ohio State Dental Society.

# THE TRUTH AND POETRY OF DENTISTRY.*

BY DON M. GRAHAM, M.D., D.D.S., DETROIT, MICH.

THE TITLE of this paper may be, to many, misleading, and even meaningless. In order to prevent any misconception of its purport, let it be said that its purpose is to present a brief review of some phases of dentistry, to the end that the discussion which will follow may serve as a clearing house for conflicting dental ideas—an inventory of approved dental procedure, as it were, a sifting of the scientific and helpful from the empirical and mischievous.

It was inevitable that a young and enthusiastic profession should indulge, unwittingly, in over-statements and misstatements regarding the value of many devices and methods of dental procedure. This consorting of truth and poetry is confusing and discouraging always, and baneful and harmful often. It is believed that any discussion that will tend to clear the decks of some of this accumulated and uncomfortable burden of untruths and half truths will be welcomed by all. In the light of some present-day advances, we may confidently predict some measure of success in the consideration, this evening, of a few mooted questions of every-day dental practice.

The indictment of modern dentistry by members of a sister profession has called forth some caustic comments from the dental profession, but a careful analysis of these strictures, and the facts in the case, force us to the painful conclusion that they are in the main true. Dr. Hunter has not been the only observer who has directed our attention to septic conditions of the mouth caused by faulty dental operations. As pointed out, editorially, in a number of dental journals, there has been abundant rebuke from members of our own profession for the same reason. It appears we resented these imputations only when assailed by members of another profession, for has it not been obvious to most of us for some time that much of our work, especially large bridge restorations as commonly performed, was of doubtful service to the patient, considered from a hygienic standpoint. That there is today more dental sepsis in the mouths of any community because of such restorations is a sweeping and condemnatory statement which we fear contains more truth than poetry. The almost ideal conditions found in individual practices constitutes but a very small percentage of the dental clientele of any community, and while we are awaking to the importance of this subject and making progress, there yet remains much to be done, or rather undone, before we can successfully controvert the statements of Dr. Hunter and others.

No doubt, in the early days of our profession, a great deal was made of the belief that mastication was of the utmost importance to perfect digestion and assimilation, and much of the dentist's missionary efforts were spent in impressing the laity, as well as his medical associates, with this fact. Having succeeded in this undertaking, his efforts were directed to restorations, that masticating surfaces might be restored to as nearly as possible their original occlusion and contour. Plates, crowns and bridges of every conceivable kind and description were constructed with no other thought than that of serving the function of mastication. Reports of cures from digestive disturbances and impairment of nutrition were at hand, and the average dentist was about to wind around himself the cloak of self-satisfaction, believing himself to be a great public benefactor. He undoubtedly would have continued his noonday revery had not a few latter-day insurgents aroused him, protesting that the nation was being rapidly poisoned quite as much by improper dentistry as from the lack of that art. This cry was taken up readily and eagerly, for had not every dentist of observation known that much of his restorations was a delusion and a snare and filthy beyond description. But he had consoled himself with the thought that the demand for the esthetic and the necessity for masticating surfaces left him no alternative than to impose upon his patients this substitution which was unspeakably filthy.

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*Read before the Michigan First District Dental Society, 1912.

Having just educated our patients to the porcelain idea, we were naturally loath to discourage or discard the esthetic. The introduction of removable facings and the employment of porcelain molars and bicuspids. in bridgework, but added to the sum total of oral sepsis. In close and moderately close bites, in the molar and bicuspid region, it was inevitable with a porcelain veneer supported by a gold sub-structure, that the tissues should be impinged upon and that these restorations should afford an ideal shelter for fermentative and putrefactive products. We attempted to correct this by a system of frequent visits which were employed to dislodge the debris by polishing the teeth and mechanical substitutes, and by instructing our patients in the personal hygiene of the mouth. All this was to little purpose, as the restorations were so made that self-cleansing was impossible, and the next few meals found the oral conditions almost as bad as they were before. The practice of placing closely on the tissues restorations with the intention of excluding these products did not appeal to many for the reason that mucous membrane takes rather unkindly to any impingement. Sooner or later these structures become inflamed, sometimes to the extent of the tissue cells becoming proliferated and hypertrophied—a condition which possesses a potential malignancy. In short, the construction of fillings, crowns, and especially large bridges, without due regard for self-cleansing properties, has contributed immensely to the grand total of oral sepsis, which we believe is as pronounced and abundant today as it ever was, the reason being the enormous increase in dental operations with attempts at aesthetic and broad articular restorations. This statement, we believe, cannot be successfully controverted, regardless of the fact that the mouths of many patients are in a most creditable sanitary condition and that there has been lately a gradual dawning, a marked improvement, a distinct advance in this particular. The accompanying radiographic reproductions speak for themselves and show that sepsis of concealed dental structures is also more common than we were wont to believe. When our attentions were first called to the importance of this subject many of us assumed an apathetic, and in some cases, a hostile attitude, contending that it was not clinically evident that persons with unsanitary mouths were less robust and healthy than those who were most careful and fastidious in this regard. Others went to the opposite extreme and saw in oral sepsis the cause of all ills to which the human flesh is heir. It was so easy to be an extremist, so easy to generalize, that it was most natural to find within the ranks of the oral hygienists not a few enthusiasts of pseudo-scientific inclinations—a situation which is as detrimental to true professional progress as is an attitude of indifference or open hostility. It is not surprising, therefore, that much that has been written on this subject dealt in fanciful superlatives to the exclusion often of simple, fundamental, physiologic truths.

It was to be expected, perhaps, that we should have the usual wave of enthusiasm. This subject, indeed, was a most fascinating one, lending itself easily to conjecture, fanciful imaginings and startling conclusions. Poetic license has already been invoked in its behalf. Have we not been visibly touched with our heavenly function of being "the guardians of the gateway of nutrition?" Have we not been asked to replace that old diagnostic injunction, "Show me your tongue," for "Show me the first four inches of your alimentary canal?" The information in each case, in the opinion of the writer, is about as reliable and conclusive as the practice of looking into a hen coop, through the keyhole at low twelve, to ascertain the number of chickens contained within. That the uncared-for mouth is a lodging place, an incubator of pathogenic bacteria, cannot be denied. That from these bacterial poisons may be absorbed into the system, and that sometimes grave toxemias may follow is equally true. The tubercle bacillus and other germs of contagion are found in the oral cavity, but little work has been done to prove conclusively that tubercular lymph glands, or tubercular tonsils, are the result of a lack of oral hygiene. A great deal of work has been done on extirpated tonsils, and it has been conclusively proven that they have been responsible for a variety of clinical conditions, such as joint lesions, nephritis, heart lesions and recurring tonsilitis, but the claim that the condition of these infective tonsils was the direct result of poor oral hygiene has not yet been scientifically established, and, so far as we know, little work along these lines has been done excepting the making of bald statements. In our endeavor to place the responsibility on oral sepsis, we have lost sight of the fact that the majority of infectious diseases are of respiratory origin, and that the nose, the accessory sinuses, the lymphoid tissue of the pharynx and the naso-pharynx, together with the tonsillar crypts, are quite as exposed to infections and quite as likely to contribute to these toxemias. Considered in its broadest sense, oral hygiene unquestionably contributes greatly to the conservation and comfort of dental and peridental tissues. Its true prophylactic status in general toxemias is yet to be determined, however, and it would seem eminently proper and opportune for some dental body to undertake this important work of scientifically investigating the systemic evils of oral sepsis. A commission composed of scientific men, supported by the profession, would create an interest that would be most helpful and would, it is believed, in a short time add material light to this chapter of dentistry which as yet has had little to illuminate it by way of serious scientific investigation. With the evidence thus deduced we could talk more convincingly, because more certain of our logic, and we should not then have to suffer the humiliation of retracting or renouncing immature professional opinions, which is inevitable when a propaganda is not founded on a scientific basis. In the meantime let us not allow ourselves to be lost in the sloughs of glittering generalities for the sake merely of embellishing a fascinating subject or embroidering an interesting theme.

The latest assumption, if not presumption, is the claim that the dentist is the rightful judge of diatetics. So much has been said and written on food and food values in professional and lay journals by professional and laymen that it is not strange, considering the meager equipment the average dentist possesses in this particular, that he should indulge in rather extravagant and strange utterances on this most important subject, which has baffled the minds of the most advanced and scientific men of this and other ages. We hear a great deal about bone-building elements, lime salts and inorganic constituents. It would appear, from a perusal of some dental articles, to be only necessary to place in "the gateway of nutrition" foods rich in these constituents, that they might in a very short time be carried to the teeth and other bones deficient in these elements. The purileness of such statements appears evident when we consider the physiology of digestion and assimilation. One of the most advanced writers on this subject has said, "The cells of our body never learn what the character of the food which we eat really is." This view of nutrition is held by most advance thinkers. Before the foods leave the alimentary tract they are disintegrated into common fragments. Whether it be meats, or cereals, or fruits we ingest, is largely a matter of indifference to the organism, as they all furnish similar digestive fragments. Just so long as the alimentary processes perform their function, it is safe to say, with a cheerful mental attitude, any normal individual, if he work moderately and eat within reason, could sustain the "nitrogenous equivalent" by either a meat, a vegetable or a fruit diet. A mixed diet containing all three, under ordinary circumstances, would appear to be the rational and proper thing to ingest. I am old-fashioned enough to think what the majority of people generally eat is generally right and that fads in dietetics depend for their popularity, and even success, on their novelty, and the mental attitude and changed environment of the patient. One thing seems certain, if the dentist is to assume the roll of dietetic instructor, he must first equip himself on the fundamentals of physiologic digestion and assimilation, for we shall soon tire of his pontifical utterances and shall refuse to accept his statements as oracles on a subject on which as yet he knows little or nothing.

While it is eminently proper and exceedingly encouraging to find dentists widening their horizon and quickening their interest in everything that pertains to the general physical well-being of their patients, is there not a danger that we shall, by so doing, dissipate our energies and gain superficiality at the expense of proficiency along special lines? If we are to avoid humiliating retractions, it were better that we advance slowly along lines of approved scientific progress rather than revel in superlatives by saying, among other things, that oral sepsis is the fountainhead from which flows contaminations that are responsible for most of our indispositions. This most worthy and creditable propaganda should redound to the credit of the profession, as well as to the great benefit of the public, if carried along sane, safe and sensible lines. Perhaps these over-statements and misstatements are to be expected in a campaign of education which is subsidized by some of our aggressive dental supply houses. The language and the sentiments expressed in some of these articles are not unlike the phraseology and logic of an up-to-date dental advertisement. In the absence of scientific data, it were better that we accept the conservative attitude that oral sepsis is a contributing factor to many systemic disorders and await further proof of the true etiology of the many indefinite constitutional derangements and auto-intoxications which as yet have not been definitely classified. In the meantime there is abundant opportunity for the employment of our talents and time, a goodly portion of which might be profitably directed to improvements in our operations on concealed structures.

For many years we have been in blissful ignorance of the true condition of our devitalized teeth. Many of us believed that our root canals were filled to the end, and in proof of this we were wont to proclaim that the patient flinched when the root canal filling impinged upon the apical tissues. That this outcry of the tissues was not properly interpreted we now know, for radiography has taught us that not one root filling in ten, as commonly inserted, reaches just to the apical foramen. A sensitive peridental membrane will resent a pneumatic pressure quite as forcibly as the intrusion of a root canal point, and the fact is that the former is most frequently the cause of discomfort in our root canal treatments. A perfect root canal filling is one that is seldom found, even in the practices of our best operators, if we are to understand by a perfect root canal filling one that reaches to the apex and not beyond it. However, a successfully filled root canal is one that is not so uncommon, and is a term which might properly be applied to a root filling which does not result in an appreciable apical pericementitis. The presence or absence of apical irritation or abscess is due to one of many causes, not the least of which is the degree of natural resistance of the tissue cells to mechanical or pyogenic irritations.

To this resistance, by the apical tissues, we owe our ability to perform the majority of our operations on devitalized teeth, for as has already been said, few indeed are the root canals that can be said to be so perfectly filled that there cannot be found radiographic evidences of faulty technique, with the inevitable consequence of some degree of apical inflammation. The statement that the conscientious operator can fill nearly all roots nearly to the end is found in actual practice to be about the truth, and only Nature's kindness permits us to construct on these abutments serviceable substitutes such as fillings, crowns and bridges. However, when large portions of canals are unclaimed, as is often the case, through carelessness or on account of anatomical difficulties, or when for any reason the opsonic index is below normal, our efforts are rewarded with apical abscesses attended in all cases with more or less systemic involvement.

The great difficulty and sometimes impossibility of reaching the apical end without root fillings has suggested and evolved all kinds of short-cut root canal treatment—medicated cottons, powders, parrafin, etc., have been employed, but clinical experience, as well as radiographic evidences, have conclusively proven that nothing short of sterilization and obliteration of canal by some non-absorbable, non-irritating material is worthy of the name of a permanent root canal filling. In our endeavor to enlarge constricted canals, or reach the foramen of tortuous ones, we have sometimes perforated a root. It might safely be said that the dentist who does not ocassionally perforate a root or occasionally force his root filling beyond the apical foramen does not show sufficient zeal in this work to do generally creditable root canal work. In these constricted and tortuous roots radiography is of incalculable value, not only in revealing the extent of root reclaimed, but suggesting at the same time the direction from which we must approach the canal orifice. The only comforting feature about these difficult root canal operations is that the more constricted and tortuous the roots the less likely are they to give after trouble, but this fact should not deter us from reclaiming as much of their extent as possible, for even these present foci for infections, which are capable of doing much injury if the natural resistance of the body cells falls below par. It is safe to say, however, that if we have done our work conscientiously, few indeed will be the roots that will give after trouble.

The dormant abscess about devitalized teeth is a pathological condition of serious import and one which has as yet received little attention from the dental profession. The presence of pus about the teeth, or a fistulous opening, is generally sufficient to direct the dentist's thoughtful attention to the offending tooth, yet it would appear that we have grown so inured to these everyday pathologic expressions about the mouth that we have frequently ignored their presence and even discouraged their treatment, to the great injury of the patient. It was not to be expected, therefore, that serious attention would be given the dormant abscess—a condition which does not show itself locally, and is revealed only by the radiograph—but which has been found to be responsible for a good many indefinite aches and pains about the head and face. Within recent years a great deal of work has been done along these lines, in general medicine, and many vague constitutional disturbances have been found to be caused by some local infection in distant parts of the body, which was unsuspected, and revealed only by the use of the X-ray. It not infrequently happens, in radiographing, to ascertain the condition of a certain tooth, there is gleaned the information that some other tooth or teeth, unsuspected, have about their apical ends abscesses, the contents of which enter the circulation and does much injury to the health of that individual. The treatment and correction of these blind infective foci has resulted often in curing neuralgias and improving wonderfully the general condition of the patient. Unerupted and impacted teeth, as well as retained roots, are found to be not infrequently the cause of many grave mental and physical disturbances. Even insanity and death have been attributed to their presence. Their detection and removal constitutes an important branch of humanitarian dentistry.

It would appear that we have about convinced the medical profession that neuralgias about the head and face are generally of dental origin, for many physicians are taking us at our word, with the result that they are referring these cases to us for diagnosis. Can we rise to the opportunity and establish a reputation of being acute and accurate diagnosticians in our own department of the healing art, or shall we leave it to our medical confreres to disclose the fact that many of these obscure pains, and even apparently unassociated constitutional disturbances, are of dental origin?

In closing, let it be said that it is a serious situation when our profession is being accused of ignoring local oral conditions and performing dental operations which alike are capable of causing grave systemic disturbances. If our work is to gain the respect of the community and the approval of all who are interested in public health, we must not be content with temporarily relieving dental pains and inserting substitutes for masticating purposes, and aesthetic appearances only. In short, we must, with an eye single to the future health and comfort of the patient, perform our dental operations to the end that infection of dental or para-dental sources may not be allowed to contribute to the sum total of adverse forces. At some inopportune time a serious illness may be precipitated, for are we not at all times standing on the brink of a precipice over which we may be forced by a combination of agencies, not the least of which may be oral sepsis, the result of neglected or faulty dental operations.

### DISCUSSION

**Dr. D. M. Graham:** In a great many cases the dormant abscess is found over the unfilled but devitalized tooth. In this case, of course, it is an easy matter to detect the condition. Sometimes it is associated with the devitalized, filled or partially filled root canal. In the vast majority of cases, where our root canal fillings do not reach to the apical end, you will find radiographic evidences of irritation or inflammation, and if it is at all extensive I should not hesitate to remove a crown, or bridge, or even amputate.

DR. O'REILLY: Instead of amputating, in these cases, why not use an ordinary round bur and scale the process and not amputate the root? Is that satisfactory?

DR. GRAHAM: Not always. In a number of slides which were shown, such attempts had been made. Where a root is roughened or eroded or perforated, you must remove the irritant before you can get a round cell infiltration, and in many cases nothing short of amputation will accomplish this. It is not always necessary to amputate, but I maintain that in cases where your therapeutic means have failed, and especially where the radiograph shows a denuded resorbed root, with often upper part of canal unfilled, and as a result pus accumulation and absorption, we are criminally negligent if we do not remove this focus of infection either by amputation or extraction, if necessary.

DR. O'REILLY: Why amputate if you can clean off the outside?

DR. GRAHAM: You cannot know definitely whether you have or have not cleaned off the outside. You cannot successfully polish or trim off the palatal surface of a root apex, besides the root canal may be the real focus of infection..

DR. O'REILLY: Suppose your abscess has not gone far enough to involve?

DR. GRAHAM: We cannot tell, without a radiograph, whether it has or not. However, I have been speaking where it has involved, and where the root apex stands without osseous support. Undoubtedly, many of the milder cases can be cured if you remove the irritant by a scaler or a bur. When this cannot be done, amputation is the proper thing, and then you are sure of having obliterated that infected process. I would not amputate until I were sure that medicinal treatment or some less radical method would not avail. I think it wrong to give a tooth thirty or forty treatments. If a half dozen treatments do not show results, and if radiography shows evidences of mechanical irritation, I think it folly to further treat, medicinally, that tooth. The amputated teeth shown have been, without exception, treated for months, and some of them even years, but by no means does the propriety of an amputation depend upon the length of time the tooth has been abscessed. It is a question of the amount of infection; a question of the condition of the root and its surroundings. If this condition is such that it will remain an irritant, the removal of that tooth, or the removal of the irritating part of it, is the surgically correct thing to do. I have already said scaling the end of the tooth, especially if you have forced some gutta percha through the foramen, will be effective and sufficient. Sometimes the removal of particles of gutta percha, or even necrotic tissue, can be accomplished with the use of the round bur, but after you have done all these things and you still have a fistulous opening, or any other evidence of necrosis or infection, I think we are in duty bound, professionally, to remove that whether by amputation or extraction. That is my stand. I am sorry that I conveyed the impression that I was pessimistic in our work. I am not. I think it is surprising that we should fill so many of these canals so well as we do. We are working entirely in the dark and on concealed structures. It is like bringing a man into a dark bowling alley, giving him a ball and asking him to make a ten-strike in the darkness. He may do it occasionally, but is just as likely to go in the gutter—which is tantamount to perforation of the root. The likelihood is that he will make a five, or a six, or a seven strike. I know some men who claim to fill all roots to the end. I am not here to dispute that statement, because I have not examined all their work, radiographically. I maintain that the first requisite to successful root canal filling is that we be paid for our time. Unless we demand payment for this time, it is reasonably sure that we will have many failures. Let me say, by way of encouragement, that it is my experience that the men who ocasionally perforate roots are the men who are most zealous and careful in their root canal fillings. As soon as many of us meet an obstruction we cease operations on that root canal. When I have a patient sent to me on account of a perforation I tell her this, and I am quite sure that no patient has ever come into my office to be radiographed for a perforation who has not gone away with a much higher estimation of dentists and dentistry, when there was a reasonable excuse, anatomically or otherwise, for such a misfortune. I believe it is impossible to do anything approaching scientific root canal filling without employing a great deal of time and, not infrequently, the X-ray in this work. There is only one thing that saves the majority of us from the consequences of our devitalized teeth, and for this we must thank Nature in being so very kind to us. So long as we have a high opsonic index, so long as the tissue cells act to the advantage of the organism, we can carry on slipshod methods in our root canal operations.

If I have said anything tonight that seems pessimistic or discouraging, it was not my intention, but I think it is always well to uncover some of the half-truths and untruths in our profession. Every profession has them. The medical profession abounds with them, but our own, constituted as it is, should be more nearly an exact science because we are treating, generally, conditions that can be fairly well seen. I was reading an article by an X-ray specialist, of another city, who was greatly surprised to find that while dentistry yielded itself to successful radiography better than any other department of medicine, yet it was rare indeed for him to be called upon by the dental profession for such diagnostic information. It is true, that in no other department of the healing art can we get such accurate information from the radiograph as can be had in the dental apparatus, for the reason that we have here structures of different densities which will be accurately recorded on the dental film and only a correct interpretation is awaited to reveal the hidden mysteries of these concealed structures.

# DENTISTRY AS AN ORGANIZED PROFESSION.*

BY G. S. JUNKERMAN, A.M., M.D., D.D.S., CINCINNATI, OHIO.

FROM the beginning of the human race man has been prone to turn his eyes inward in the observance of the mechanism of his own marvelous and mysterious body. His fellow animals have likewise been the victims of his keen curiosity at first, and later subjects for scientific observation. *Wonderment* at first, followed by *analysis* and *imitation,* are the qualities that have made of man a constructive and inventive being.

There is no structure, whether static or dynamic, that has been woven by man but finds its counterpart in the structure and movements of his own organism. *Imitation* and then *assemblage* of the various first principles is responsible for the *simplest* as well as the most *complex* inventions of man. Furthermore, nothing else has been *invented,* for man cannot create—he can only imitate, assemble and organize that which exists already and what has always existed. First principles assembled and organized absorb strength, efficiency and recognition when united in a concrete and sympathetic whole.

The existence of all conceivable structures, likewise all conceivable forces, would avail but little to make and put into action the animal body if the parts were not properly assembled and connected by nervous systems organizing them into *members.* These *members* in turn must be connected, as they are, by a sympathetic nervous system which affects the integral efficiency of the body and makes it a perfect machine. For example, the two lower extremities of the body might be thoroughly constructed and supplied with a motor and sensory nervous system, yet section of their sympathetic nerves might result in one leg trying to go north while the other one would be trying to go south, thus destroying co-ordinate efficiency. The prizefighter reaches for his antagonist's solar plexus, being the sympathetic center, because injury to it produces *unorganized* corporal activity in all parts of the body. With his own living example always before him, as the acme of perfection of organized efficiency, man has awakened to the knowledge of the utter fruitlessness of individual endeavor as compared with sympathetic organization.

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*Read before the Cincinnati Dental Society, 1912.

The professions have always kept up a semblance of organization. There was a time when these organizations were constituted of what were known as the learned people, and the line was drawn between them and those that were not supposed to be educated but belonging to the trades. But now all walks of life are organizing and educating to such a degree that the sympathetic bond between individuals and organizations is coming to be appreciated. The word *competition* is taking on cellular activity, resolving itself into *intelligence,* which destroys envy, and awakens to the fact that what constitutes the good of an organization is only the reflection of the good that is in its individual members. A great element of strength of an organization rests upon the well-established principle that a *majority* rules. To establish a *real* majority in any institution of life, the organization must have within its ranks a large percentage of the exponents of that institution. Do the majority of dentists belong to dental organizations? Such must be the case if dentistry is a well-organized profession. Having secured a real and not a pseudo majority, the "a priori" strength of such an organization lies in the establishment of a sympathetic nervous system between all the individual members of said organization as well as the same kind of system between the various organizations of any walk of life. The ability to organize is a talent not possessed by all. Envy and jealousy of these should be turned to sympathy. Any rewards that they may reap from such initiative is only a just compensation for labor done; a labor, however, which declares a dividend for all. Such must be the case with dentistry if it is a well-organized profession. For those who are in dental organizations and those who should be there, that conceive the idea that they have enemies within or without, I would suggest that *our enemies are only our friends who do not understand us.* Nothing is gained by standing at a distance throwing stones at our imaginary enemies. We may produce a few bruises by an occasional hit; but this only irritates and does not destroy them. A more effective way would be to come in close, where we may use a knife to cut out the soft spots. This can be done in most cases with little pain and without the administration of an anesthetic. Furthermore, close observation might contra-indicate an operation, as a different point of view has been known to transform a seeming vice into a virtue. I have no sympathy with the scoffer or the man who views the parade from a convenient spot and casts stones out of the second story window upon the heads of the participants who are marching accoutered in the shining armor of the profession. In turn, such missile throwers should be captured and brought into the fold. A bath and change of linen might make good disciples of some of them.

Twenty years ago every member of the profession of dentistry was my competitor. Now they are only my co-laborers. Many have been more successful than I am, but it is a real pleasure and a pride to me to shake hands with a successful dentist, and a real sorrow to hear of or see a failure. If you hear of a *success* hunt him up and eat dinner with him. A full stomach may make him divulge the secret. To slink into your shell is a sure step to fossilization, which is worse than self-disorganization.

Dentistry has other organizations, such as the organization of colleges and the organization of examining boards. These, with the dental societies, all should have a singleness of purpose, which is that of making dentistry a factor in the affairs of the world. Have these organizations established the sympathetic bond between each other? If they have not, then dentistry is not a well-organized profession, because it lacks co-ordination. In developing sympathy for each other, do not forget to stimulate the sympathetic cells of your association for your sister ones. Snow and rain are weak elements as compared to what they become when cemented together in the immense icebergs with which the great greyhounds of travel and commerce must reckon in their progress over the high seas. So dentistry demands, not begs, recognition in proportion as its parts are cemented together and developed into a concrete whole.

I apologize for this paper insofar as it brings into discussion that old and threadbare topic of dentistry as a branch of medicine. Dentistry has never gained anything by such discussions, but has rather lost some of its organization by the frenzied attempts of some of its members to hitch their cars to the tail of the medical kite. Dentistry is dynamic enough to spurn salvage assistance. There is no logical reason for dentistry to clamor to become a part of *anything* else. It is great enough and distinctive enough to be an integer. There is no deficiency in respect for it, except *self respect*, which is shown when we beg protection of a fold of the medical mantle instead of constructing a mantle of our own. I prefer to think of dentistry as one of the *parallel* professions which occasionally sends out an anastomotic plexus. Perhaps this anastomosis with medicine is more marked than with the other professions. There is every evidence to the contrary that man developed from the monkey, but that man and monkey sprung from the same source scientific study fully substantiates. When our forefathers gave us the D.D.S. it was at the parting of the ways, and a parallel line was then established. That line carries so much freight and so many passengers now as to have become a factor in the world's traffic, and the only circumstance that can take away our prestige is internal dissension and disorganization. I do not wish to cast aspersions upon dentists who have studied medicine. All honor and credit to them. They have gained much by the education represented by the M.D. degree, and had they taken the degree of engineer, law, theology and all other professions, they would have been keener men and wiser dentists. My plea is not for arrogance but for independence, self-respect and organized effort, seasoned with intelligent sympathy.

Our idea of this paper would be incomplete if we should fail to mention the lately organized association of *dental hygiene.* Every dentist should be a member of this body, and it gives a striking opportunity for the development of the sympathetic nervous system. Where the people are being educated to become patrons of dental science, there is a great liability of the organizers and lecturers being accused of turning their association with the people into personal gain. Such a view is shortsighted and narrow-minded. If they gain by it, it is only a just reward, and a reward which all dentists will share with them. No manufacturer does or wishes to retain his own products. He distributes them to the public. The aim of every dentist is to manufacture patients by educating them to the needs of dental services. The leaders in the hygiene movement are wholesale manufacturers of patients and your contributions, and above all your sympathy, for them in the work will pay you large dividends.

Envy, jealousy and inharmony in the human body are nerve depressors and promote disorganization, followed by incoordination of the machine. Such a spirit in the minds of exponents of a profession is most detrimental to the proper development of the sympathetic nervous system, which is the foundation of good organization. If the profession of dentistry has not such a system it can develop one, for it has all else to make it an independent and well-organized profession.

During the course of this paper I mentioned the importance of having organizations made up of a real majority. Much prestige has been lost by not having this majority. The dental examining boards are mostly constituted by political preferment because our dental societies, when investigated by the appointive power, are found to contain such a small percentage of the profession that they fail of the influence that would accrue could the profession stand as the unit that would be expressed by a majority. Our state governors do not appreciate quality to the exclusion of quantity, which seems to them to be the criterion of strong organization. Yet our dental societies are the best judges of qualifications needed by members of examining boards, but are unable to impress the appointive power simply because they lack strong organizations by numerical absence. We need more proselytes in our dental societies to secure greater numerical as well as sympathetic strength in their disciples. Our dental college association is numerically strong. Its colleges, however, lack system and sameness in course of study, thus destroying, to a great degree, domestic sympathy; and as long as that is deficient the quality and quantity of foreign sympathy, as expressed by other dental organizations, will be manifestly weak. The National Association of Dental Examining Boards can never be well organized until that bond of sympathy shall be established between the various state boards so as to permit practitioners of *any* state to become practitioners at will of *all* states. Exclusions are indicative of professional dissensions. If we would win respect we must, as a profession, have self-respect. We must get together in one grand aggregation. Small tea parties that amuse themselves by singing the Anvil Chorus may be fashionable, but they are not formidable. The Hallelujah is what we want, and that requires *harmony* and a large *crowd.*

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# SOME THINGS THAT SHOULD BE KNOWN ABOUT THE MOUTH HYGIENE MOVEMENT OF THIS COUNTRY

BY W. G. EBERSOLE, M.D., D.D.S., CLEVELAND, OHIO.

SECRETARY-TREASURER OF THE NATIONAL MOUTH HYGIENE ASSOCIATION.

WE ARE WRITING that we may place in the hands of the profession some facts which we feel should be understood by the members of the profession.

The Mouth Hygiene movement of this country has received a tremendous impetus during the past few years, and as a result the great majority of the members of the profession have awakened to the fact that something worth while has been and is being accomplished.

Since the Union Mouth Hygiene meeting of the National Dental Association, the National Mouth Hygiene Association, and the District of Columbia Dental Society the words of praise and commendation which have been received on all sides by those who were responsible for this great meeting have been very gratifying indeed. There has been a tendency to give some two or three individuals the credit for most of that which has been accomplished. In fact, there has been so much of a tendency in this direction that we believe a halt should be called in the interest of the cause. Those at the head of the work are not men who are looking for personal credit or commendation; what they are seeking is the support of the members of the profession in carrying on the campaign which has been undertaken in the interest of both the profession and humanity. No man or small number of men could bring about the results which have been obtained.

No general ever planned a great campaign without counseling with his fellow officers. No great battle was ever won by generals or officers alone. There must be soldiers in the ranks—men behind the guns to make victory possible.

That the National Mouth Hygiene movement has met with a degree of success we think all who have watched it will concede. That success has been due to the caliber and quality of most of the men associated with the great movement. Several years ago some of these men set out to bring about four things:

First.—To secure data showing the actual conditions of the mouths of the school children of this country and to conduct a series of experiments which would, in a measure, establish the value of healthy oral conditions.

Second.—To establish a National Mouth Hygiene educational system which would be equally acceptable to the leading oral hygiene men and to the health and educational authorities of the country and secure the endorsement of the same.

Third.—To organize and place upon a working basis a national organization which would permit the members of all professions and the laity to co-operate in spreading the Mouth Hygiene propaganda.

Fourth.—To obtain the recognition and approval of the heads of the various departments of the National Government interested in questions of hygiene and sanitation.

With the Union Mouth Hygiene meeting, held at Washington on the evening of September 13, 1912, and the results which immediately followed this meeting, the fact was demonstrated that the results which we set out to secure four years ago had been accomplished in the most satisfactory and gratifying manner to those active in the work.

We say to you frankly that the results obtained were a source of a great deal of gratification to us, for upon that occasion we not only succeeded in holding one of the largest and most enthusiastic Mouth Hygiene meetings that has ever been held in America, but immediately following the same the National Mouth Hygiene Association was permanently organized with a membership sufficiently large to insure the ultimate success of this organization. The membership includes practically every prominent Mouth Hygiene worker in the country and many of the most prominent members of the dental profession as well.

This organization is an auxiliary to the National Dental Association and was formed in Cleveland, Friday, July 28, 1911 (under a resolution passed by the N. D. A., granting permission for organization), for the purpose of permitting all professions and all laymen who are interested in Mouth Hygiene to co-operate with the dentists of this country in spreading the Mouth Hygiene propaganda.

The men who were responsible for bringing about this organization were men who had given years of study to the question and were convinced that an organization of this kind could be made to accomplish things impossible to dental organizations. It was the purpose of these men to have an organization created which would co-operate with dental organizations in accomplishing the results they are seeking in the matter of educating the public to the importance "hygiene of the mouth" bears to the general hygiene of the body; and it is the plan and policy of the officers at the head of this organization to see that this association interferes in no way with the prerogatives of dental organizations.

The wisdom displayed by those who were responsible for the new organization has been proven by the phenomenal results which have been attained during the short life of the association.

Through its activities it has been able to secure rank and recognition for both the question of Mouth Hygiene and the dental profession, which has been impossible heretofore. No dental organization nor any number of dental organizations have been able to secure results which have been attained by the National Mouth Hygiene Association. This association last year produced and distributed thousands of reports of the Marion School Class experiments throughout the country in positions where they would accomplish the most good.

These experiments, while not entirely satisfactory to the originators of same, or to those interested in the subject, have been of sufficient importance to command world-wide attention, and have set the members of the medical, dental, and teaching professions to thinking as they never have thought before, and have secured for the dental profession recognition impossible to get heretofore.

Those responsible for the National Mouth Hygiene Association have always felt and maintained that just in proportion as the dental profession proved its worth to the world at large, just in that proportion would it receive rank and recognition.

First we produced facts and figures showing the value of securing and maintaining healthy oral conditions, and then gave sufficient publicity to the same to secure the attention of the entire world.

As a result of the activities displayed in this connection, those prominently connected with the Mouth Hygiene work throughout the country have received attention and consideration not accorded in the past. The Mouth Hygiene workers of the country who attended the Fifteenth International Congress on Hygiene and Demography can report the most gratifying kind of consideration and treatment as far as rank and recognition were concerned.

The most marked recognition received was that given by President Taft, Surgeon-General Rupert Blue, of the Public Health Service, and by the Fifteenth International Congress on Hygiene and Demography in having a division of the program of Section III set aside for the presentation of subjects pertaining to Mouth Hygiene. This is the first time in the history of that organization that dentists or dental topics have been presented in connection with its program.

President Taft recognized the Association by sending, as his personal representative, Surgeon-General Rupert Blue to deliver the address of welcome at the Friday night Union meeting. The Association directed its secretary-treasurer to call upon the President and the Surgeon-General and express the thanks of the Association. An interview was sought and granted, and the secretary-treasurer, accompanied by Dr. W. Smith Frankland and Dr. J. D. Towner, two members of the Board of Governors, called and presented the compliments of the Association and received from the President his thanks for the courtesy extended and a statement that he was very much interested in our work.

One of the most gratifying things that occurred in connection with the recognition given the National Mouth Hygiene Association was a statement made by Surgeon-General Rupert Blue of the U. S. Public Health Service, at the time the secretary-treasurer called, as directed by the Association to thank the Surgeon-General and present its compliments. At this time the secretary-treasurer said that during the time the election of the National Mouth Hygiene Association was being held, it occurred to him that he should have asked the Surgeon-General, prior to the election, whether he would accept an official position in connection with the Association. The reply of the Surgeon-General was that he "would have considered it an honor to be connected with an organization which was destined to do so much for humanity." Such a statement, coming from a man of Surgeon-General Blue's character and official position, does two things: First, it shows the bigness and broadness of the man who is at the head of the U. S. Public Health Service; and, second, it shows the interest which is being manifested in the new organization, which has for its purpose the correction of the faulty conditions of the oral cavity.

Following this conference a meeting of the Board of Governors of the National Mouth Hygiene Association was called for Friday, September 27th, to be held in Washington, at which time the office of Fourth Vice President was created and Surgeon-General Rupert Blue elected to that office and his acceptance received shortly thereafter. This action was not taken, however, until those present at this meeting had agreed to recommend to the members of the National Mouth Hygiene Association the creation of an official position more in keeping with the rank and position which this big and broad-minded man is entitled to receive at the hands of our Association.

To have a man of Surgeon-General Rupert Blue's character and position accept a Fourth Vice Presidency in our organization, and state that he considered it an honor to receive such recognition, is a compliment of the highest kind and one of a nature which has never been given to the members of the dental profession heretofore, and should make out of every member of the dental profession in this country the warmest kind of a supporter of the present administration of the Public Health Service of the United States Government.

At the conference between Surgeon-General Blue and the secretary-treasurer, the question of having dentists appointed to positions in the public health service was mentioned by the secretary-treasurer, and Dr. Blue at once expressed himself as favoring such appointments, and stated that if the dental profession would furnish applicants who could pass the required examinations for appointments he would take pleasure in recommending that the appointments be made.

Under the present laws, dentists making application must have both the medical and dental degree.

In a letter replying to one asking the privilege of announcing the Surgeon-General's position in this matter, he makes the following statement:

"With reference to announcing to the dental profession that a candidate who passes the examination for entrance into the Service would receive appointment, I should state that this examination is held for medical officers. No examinations are held to fill dental positions in the Service. I should be glad to have candidates take the examination who are graduates of both dental and medical colleges. It is the desire of the Bureau to forward the several lines of public health work, and an officer with the dual qualifications mentioned could render especially effective service. The examinations are comprehensive but practical, and are conducted so as to determine the candidate's fitness for the duties to which he aspires. An announcement of the opportunities for public health work by an officer having a dental and medical degree would be timely.

"Any further information that might be needed by prospective candidates as to the time for examinations, their scope, etc., would be sent from the bureau on request."

The Surgeon-General and the dental profession are both handicapped by the present laws both in this and other matters. Dr. Blue is not responsible for these laws, but the members of the dental profession are through "sins of omission." They have not made known the importance that their field of work bears to the health problems of the country.

But let us call the attention of the profession to the fact that within a very short time Congress will pass a bill creating a separate and distinct department of the Public Health Service of this country with a cabinet officer of its own. Before that department is formed the dental profession must make known to the members of Congress the fact that they are worthy of consideration in this connection.

A bureau should be established devoted to the study of those things which deal especially with the mouth. The National Mouth Hygiene Association has assumed the obligation of bringing this about. To do this it must not only have prompt and active co-operation of the dentists of the country, but must have hundreds of thousands of laymen working in sympathy with the movement and willing to exert sufficient pressure on members of Congresss to bring about the desired result. If the members of the profession rally to its support the Association will secure a layman contingency that will insure results.

When it comes to framing a bill giving the dental profession due recognition, it will be something worth considering to know that the chief Public Health Service officials are in sympathy with this movement and will work with us in the interest of the health of mankind.

As a result of the great Mouth Hygiene meeting held in Washington, in addition to the President and Surgeon-General Blue, the following National officials have given official recognition to the National Mouth Hygiene Association and have promised to co-operate with it in its publicity campaign: Assistant Surgeon-General J. W. Kerr of the U. S. Public

Health Service; Dr. F. B. Dressler, specialist in School Hygiene and Sanitation, Bureau of Education, Department of the Interior; Miss Julia C. Lathrop, chief of the Children's Bureau, U. S. Department of Commerce and Labor; Mr. Lewis Meriam, assistant chief of the same bureau, and Mr. J. C. Boykin, editor, Bureau of Education, Department of the Interior.

The National Mouth Hygiene Association has planned a nation-wide campaign for the purpose of:

*First.*—Bringing about legislation which will permit local Boards of Health and Boards of Education to co-operate in the establishment of a complete system of medical and dental inspection, and in establishing and maintaining medical and dental clinics to care for the indigent poor.

*Second.*—To secure legislation which will make it possible to protect the public from that class of dental practice which is a menace to not only the individual but to the health of the community.

*Third.*—To secure legislation which will not only improve the conditions surrounding the teaching profession of this country, but enable Boards of Education to pay salaries commensurate with the service rendered.

At the present time few of the states have laws which will permit either Boards of Education or Boards of Health to establish and maintain medical and dental clinics for treating the indigent poor. The need of laws which will permit of the establishment of suitable clinics will be conceded by all and needs no comment.

That there should be laws passed and placed upon the statute books which will protect the public from that class of dentistry which Dr. Hunter of England so thoroughly condemns in his article also goes without saying.

Statistics compiled by the Michigan State Board of Health show that 27.6 per cent of the public school teachers of the country succumb to the ravages of tuberculosis, while 9.4 per cent of the people in other walks of life succumb to this disease. What is true of tuberculosis is true to a great extent of all other diseases; and if the investigations of the Michigan State Board of Health are correct, it certainly makes the teaching profession a very hazardous one. It is conceded on all sides that the teaching profession is decidedly underpaid for the service rendered; many of the teachers having to rely upon what they can earn during vacation to help support them through the year. Therefore, in our campaign for health improvement, in the public schools of the land, the Association feels that it should also make an effort to secure sufficient compensation for the teaching profession, to permit them to spend their vacations in a manner which is conducive to good health.

If conditions surrounding the teaching profession are such that so large a percentage of them succumb to the ravages of tuberculosis, what must be the effect upon the public school children who spend from six to twelve years surrounded by the same conditions? The Association's activities for this one field alone should insure the active co-operation of every progressive member of the dental profession.

One of the important steps taken by the National Mouth Hygiene Association, in its educational campaign, has been the production of the motion picture film entitled "Toothache," which was shown first at the Washington meeting of the National Dental Association, the National Mouth Hygiene Association, and the District of Columbia Dental Society, and later at the Fifteenth International Congress on Hygiene and Demography and the National Conservation Congress; then before dental societies in a number of the larger cities, and before the Ohio State Dental Society the first week in December. Upon every occasion it has been enthusiastically received and endorsed by the members of the dental profession as the greatest thing that has been offered for dental educational purposes to date. Many of the newspapers in the larger cities where this picture has been shown are giving, or are planning to give, full pages in exploiting the work of the Association, and nothing that the profession has done seems to appeal to the editors of the newspapers in this country so much as the presentation of this motion picture educational film. Those interested in Mouth Hygiene work should see to it that the newspaper men in their towns and cities have an opportunity to see this film and become convinced of its value in dealing with the health problems of this country.

At the Washington meeting the Association instructed the secretary-treasurer to enter into an active campaign for the purpose of securing the largest possible charter membership from among the ethical dentists of the country by January 1st, 1913. But, due in part to the poor health of the secretary-treasurer and in part to complications which arose later, the secretary-treasurer was unable to carry out his instructions until the time had expired. The time for securing these members has been extended for ninety days, and the Association is entering upon a campaign for the purpose of securing as charter members five thousand of the ethical members of the dental profession of this country: and desires to do this before it begins its active campaign to secure members from among the laity and other professions.

There are three objects in doing this:

*First.*—To put back of this movement the largest force of ethical members of the dental profession that has ever backed a humanitarian movement.

*Second.*—To secure funds to make it possible to enter upon an active and extensive campaign for membership among the laymen and professional men.

*Third.*—For the purpose of having a sufficient number of dental men back of the organization to insure the control of the policies of this organization by the dental profession.

Immediately following the ninety-day period for securing charter membership, many of the most prominent and successful workers and organizers in philanthropic and uplift organizations will be placed in the field on salary for the purpose of securing membership and funds which will enable the Association to carry out its policies along the lines mentioned herein. In fact, negotiations have been entered into and some of the best talent the country affords has been engaged for this work. This force will include newspaper and magazine publicity men and a number of the most efficient organizers of philanthropic and charitable societies or associations, whose duty it will be to organize the public and raise funds for the purpose of establishing and maintaining suitable dentariums or dental hospitals to care for the worthy poor in all the larger cities in the country.

There will be a staff of legislative experts and a corps of men and women who will devote their time to bringing about conditions which will make it impossible for the "parasites" in the dental profession to continue to ply their trade at the expense of the health and comfort of innocent and unsuspecting people. To protect the public from this kind of dentistry is one of the most important missions of the Association and should bring to it the support of every ethical member of the dental profession.

The Association has placed an order for something over a million of leaflets and booklets, to be distributed throughout the country, and expects to use three or four times that number within the year.

The extent of the work accomplished and the number of experts employed will depend very largely upon the immediate support given this movement by members of the dental profession.

And, in conclusion, we would like to say that if the members of the dental profession of this country desire to accomplish the greatest amount of good to the greatest number in the shortest time, they should unite at once with that organization which has already accomplished so much in its short existence and assist it in bringing about the results it has undertaken to produce in behalf of both the profession and mankind.

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### Education for Real Life Needed

Whatever may be the differences of opinion as to the best method of vocational education, the need of some method grows more and more apparent. Under our present system probably the majority of pupils leave school—and all too soon!—with no definite idèa of how they are going to make a living. Each is merely looking for a job—as pleasant a job as it is possible to get and with as good pay as may be had, but just a job. Thus the undiscovered aptitude that each one has for some particular calling continues undiscovered, and he remains, too often a round peg in a square hole, making little or no advance through a life of toil where a lack of interest in the work makes it drudgery.

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### Finds Tooth Growing Inside of Boy's Ear

Middletown, Feb. 28.—Leo Smith, 14, was operated on for earache and Dr. D. B. Bundy, the attending surgeon, found a full-grown perfectly-formed tooth imbedded in the lining of the ear. The boy was taken to a Cincinnati hospital for treatment. The surgeon is unable to explain the phenomenon.

# ADENOIDS AND THEIR EFFECTS UPON THE GROWTH OF THE CHILD*

BY M. G. HILLMAN, D.D.S., GREENVILLE, MICH.

IN PRESENTING this paper before the Society, I do not expect to give you anything new. I do hope to impress upon the members of the dental profession the importance of more thorough work along this line.

Allow me to quote from the American Text-book on "Diseases of the Eye, Ear, Nose and Throat" the following:

> "Adenoid vegetations are variously known as lymphoid hypertrophy in the pharyngeal vault—adenoid vegetation, or Luschkas tonsil. It was first described by Czermak in 1860, but he did not appreciate its clinical importance as we understand it today. It remained for the late Wilhelm Meyer of Copenhagen to accurately portray the affection. So thorough and complete was his exposition of the subject that no one has been able to add anything essentially new to his now classical paper which appeared in 1870."

There are many theories in regard to the origin of adenoid vegetation. It was formerly supposed that the hypertrophy of the pharyngeal tonsil was made up of true glandular tissue. Some claim that these tissues contain no true secreting glands. Still others that they are lymphoid glands, being active only during fetal life, their function which ceases at birth being taken up by the spleen.

The term "Adenoid Vegetation" includes the enlargement not only of the pharyngeal tonsils but also of the closed follicles situated in the mucous membrane of the posterior surfaces of the vault and the posterior lateral walls of the naso-pharynx.

Kyl gives three important classifications of the pharyngeal tonsils. "There is a soft variety which appears as a smooth, semi-fluctuating mass over almost the entire naso-pharynx. It is so soft and pliable that it may easily be broken by pressure of the fingers.

"In the hard, or hyperplastic variety, there is an increase in the lymphoid structure and a decided overgrowth in the connective tissue elements. The surface is more lobulated, though smooth to the touch.

"The third classification is a hard variety which follows inflammatory lesions of the lymphoid structure."

## CAUSES

This pathological condition may be congenital. Children of a rachitic diathesis, scrofula, syphilis, tuberculosis are all predisposed to it. The majority of cases are seen in children from four to ten, although no age is exempt. Both sexes are equally affected. It seems hereditary in some families, but the existence of several cases in the same family may easily be referable to the same diathesis or to exposure to the same unsanitary conditions. But we also find these pathological conditions among children whose surroundings are the best that exist, so the foregoing statement is not always correct. No race or climate is exempt from this disease, although it is more prevalent in some localities than in others. It is more common in the North Atlantic States, Eastern Canadian Provinces, and in the United States extending west to the Mississippi. The sudden excessive cold and damp climate seem to aggravate these conditions. Some authors claim that from 40 to 60 per cent of the children of this latitude are affected. We do know that the farther west we go, reaching a higher altitude and a dryer atmosphere, these conditions are less noticeable among children and adenoid children, going into higher altitudes, receive relief but are not permanently cured. Children of a lymphatic tendency are more susceptible to this condition than those who have not, and with the ebb of the lymphatic tide, which comes about the time of puberty, there is a tendency of the lymphoid structure to atrophy.

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*Read before the Michigan State Dental Society, 1912.

Arising from adenoid vegetations are many conditions which have a marked effect upon the health and development of the child. Adenoid children are more susceptible to pain, more irritable, have a lowered vitality and seem to lack proper nutrition. They are more susceptible to all contagious diseases, and not only to contagious diseases but also to chronic catarrhal inflammations of the upper respiratory tract. We also find hypertrophy of the turbinal bodies, deformities of the septum, which causes either exostosis or deflections.

Associated lesions of the malady are hypertrophic rhinitis, and especially enlarged faucial tonsils, and in a few cases the nasal mucosa may be distinctly atrophic.

In my observation I have found that there is quite an intimate relation existing between the pharyngeal tonsil and the faucial tonsil. In a greater percentage of cases with children affected with adenoid vegetations we find inflamed and diseased faucial tonsils. I have further noticed that when children have been operated upon for the removal of the pharyngeal tonsils and the faucial tonsils have been left, that they have not made nearly so satisfactory improvement as those children from whom both faucial tonsils and the pharyngeal tonsils have been removed at the same time.

In many of these pathological conditions we find not only the adenoid vegetations in the naso-pharyngeal cavity, but also the lingual tonsil and the faucial tonsils, forming the so-called tonsillar ring. One clinical case of a child less than four years of age, where the lingual tonsil was so enlarged that it impinged upon the epiglottis, was brought to my attention. The child could not sleep in any position except with his face downward. Doctor Shirley of Detroit operated upon him about two years ago, and at present he is the healthiest youngster in the city.

But the more marked symptoms are nasal catarrh, obstructions of the nasal passage, malnutrition, anemia and nervous conditions. Arising from these are many symptoms among which may be mentioned, as being quite common, disturbed sleep, snoring (among children) and groaning, and occasionally nocturnal enuresis.

One of the most pronounced effects of adenoid vegetation is mouth-breathing. The nose is a respiratory organ, and its most important function is to heat and moisten the external air on its passage to the lungs. If, by any cause, this function is impaired, mouth-breathing is the result. There are certain marked changes which take place with a child where mouth-breathing has existed for long periods. These are the stupid expression, relaxed features, impediment of speech, loss of memory, lack of concentration and deafness. I have found, from examination of children of this type, that during respiration only the upper portion of the lungs was used, showing a lack of development of the lower portion of the thoracic cavity, a lack of development of the intercostal muscles of the lower thorax, a stooped curvature of the upper dorsal region. The lower lobes of the lungs are imperfectly developed through lack of use. To illustrate: we find the so-called ''pigeon-breast'' among children of this class.

I have mentioned inability of the patient to concentrate attention. Kyle states that this inability is the result of a number of conditions rather than one special cause. As this condition is usually associated with deafness, some of the dulness is explained by inattention brought about by inability to hear general conversation. Cohen and Allen have called attention to the fact that possibly the dull mental condition is due in some cases to the alterations in the circulatory relations between the brain and the naso-pharynx, either lymphatic or vascular.

From about twenty cases operated upon within the past two years, I have taken the time and trouble to secure the reports of their school work, and nineteen cases show phenomenal progress after operation.

Another effect, indirectly, is malformation of the vault of the mouth. Also, protrusion of the anterior superior teeth, forming the so-called V-shaped arch, is produced by pressure of the buccal muscles, exerted on both sides and the current of air striking the hard palate.

Korner distinguishes between the alterations of the upper jaw of children who have suffered from nasal stenosis before the shedding of the temporary teeth, and those which result from nasal stenosis during the change of teeth.

In the first instance there occurs generally the cupola-shaped elevation of the palate, the alveolar border, which naturally forms a semi-circle. assumes the form of an ellipse, but there is no change in the position of the teeth. If nasal stenosis continues, then the lateral alveolar borders are approximated while the anterior border is pushed forward and the high arch of the palate increases until it encroaches upon the cavities above.

The encroachment upon the nasal cavity by the high V-shaped arch deflects the septum or bridge of the nose, resulting in a crowding or overlapping of the turbinal bodies.

We are all familiar with the fact that the openings into the nasal passages are through certain ducts leading from the frontal sinuses, the ethmoidal sinuses, and the antrums of Highmore, or maxillary sinuses. Owing to the crowded condition of the turbinal bodies, we find the septum deflected to one side, impinging upon the ducts, leading from the frontal, ethmoidal and maxillary sinuses.

In one case of acute facial neuralgia in my practice this last winter, I found the nasal passage very much contracted, the turbinal bodies large, irregular and impinging upon each other. Upon a careful examination of the upper and lower teeth I could find no cause for the trouble, but upon pressure with my finger directly under the eye I discovered soreness. I took the case to Dr. Belknap, and, with the use of a nasal speculum and the application of adnephrin upon a pledget of cotton, he succeeded in reducing the congested condition, allowing the mucus to pass from the maxillary sinus into the nasal passage. This relieved the pain almost instantly and showed conclusively that the stoppage of the duct and pressure upon the filaments of the tri-facial nerve were the direct cause of the pain.

I believe that these pathological conditions are oftentimes the indirect cause of hay fever and many of the complications that arise from it. We do know that it is a popular treatment today to remove portions of the turbinal bodies in the treatment of this disease.

The chronic inflammatory condition of the upper respiratory tract may be the remote cause of asthmatic conditions later in life.

One clinical case that was brought to my attention a few years ago was where the duct leading from the frontal sinus was closed by the deflection of the nasal septum. The accumulation of mucus and pus in the sinus could not be removed through the duct. In order to save the patient's life it was necessary to cut through the frontal bone to relieve the pressure.

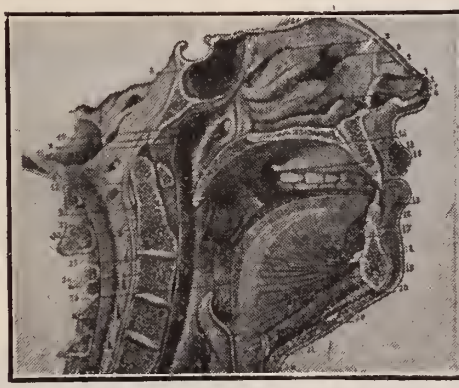
The Eustachian tubes have an irregular lumen in their lower portion. Their walls are in somewhat loose contact and appear to be closed. The tube opens for the discharge of mucus secretions of the middle ear into the pharynx. It is also open during the act of deglutition, when air finds its way into the middle ear.

One of the finest illustrations I have seen of the pharyngeal cavity was brought to my observation a short time ago. It was a double cleft showing the entire naso-pharynx and the exact position of the mouths of the Eustachian tubes. Upon close examination, I discovered that at irregular intervals mucous was discharged from the mouths of these tubes into the pharyngeal cavity.

There seems to be two important functions of these tubes: First, to drain the middle ear of mucus secretions, and, second, to preserve an equilibrium of the gaseous contents of the cavity and the external atmosphere. With the obstruction of the mouths of these tubes, by the presence of adenoid vegetations, there may be several pathological conditions arising. Many times otitis media, abscess of the middle ear, and mastoid abscesses occur. So closely related are the mastoid conditions with the diseases of the middle ear that Mayo stated, about two years ago, that "otitis media could not continue for twelve hours without the mastoid bone being involved to a greater or lesser extent."

In conclusion to the subject of my paper, I wish to take the liberty to show a few of the anatomical illustrations that we may refresh our memories upon the anatomy of the regions involved in these pathological conditions.

SLIDES



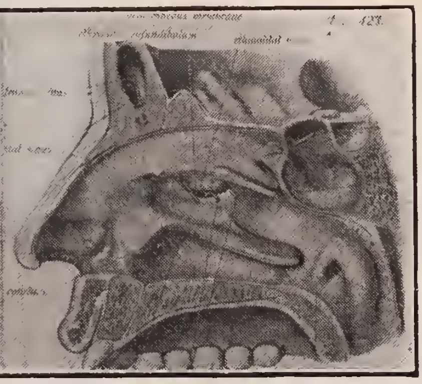
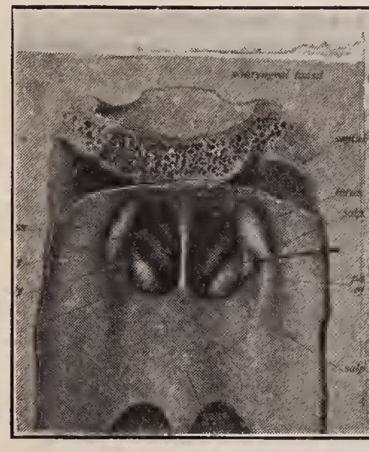
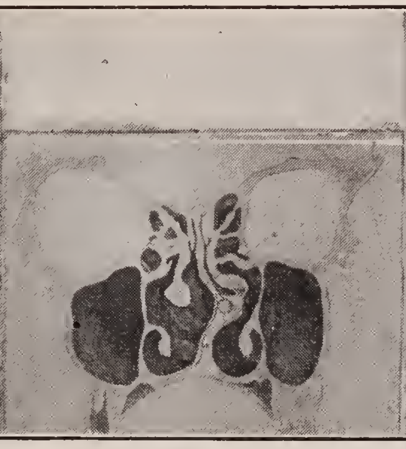


Fig. 1 Fig. 2

Fig. 1.—Sagittal section of the head and neck, showing the upper air passages beginning at the nostril, including the superior, the middle and inferior nasal meatus beneath the corresponding turbinals, the sphenoidal sinus, the Eustachian tube, the rhinopharynx and Rosenmuller's fossa, above the soft palate, the oro-pharynx, and fauces, and the laryngo pharynx.

Fig. 2.—Frontal sinus, aperture of frontal sinus, sphenoidal sinus, aperture of spenoidal sinus, pharyngeal recess, pharyngeal orifice of the tuba auditiva, aperture of maxillary sinus, aperture of nasolachrymal duct.





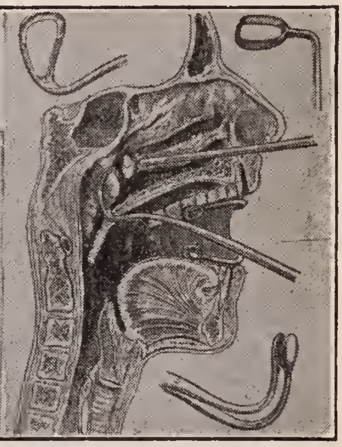


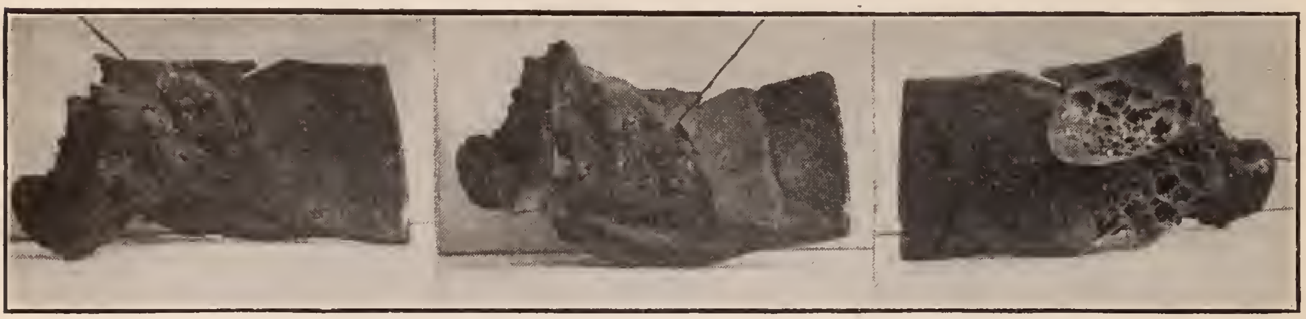
Fig. 3 Fig. 4 Fig. 5

Fig. 3.—Above position of pharyngeal tonsil, posterior portion of the nasal septum, pharyngeal orifice of the Eustachian tube, soft palate, uvula, inferior turbinated body, middle turbinated body, superior turbinated body, pharyngeal recess.

Fig. 4.—Transverse section of the nasal chambers, showing marked asymmetry, the bulbous left middle turbinated bone apparently deflecting the septum to the right and narrowing the duct opening from the maxillary sinus or the antrum of Highmore.

Fig. 5.—The Gottstein curette (its blade shown also above to the left) applied for the removal of the pharyngeal tonsil, the mouth being held open by a gag. A snare is also shown engaging a posterior turbinal hypertrophy through the naris. The Hartman curette is shown above, the Lowenburg forceps below to the right. This also shows the location of adenoid vegetation—directly back and above the posterior naris and above the soft palate. This growth ofttimes completely fills the naso pharyngeal cavity and extends down and below the soft palate, where it may be seen by the use of a tongue depresser. It also shows the ethmoidal sinus above.

The next plate shows the condyle cut away and the outer portion, being hinged, is turned back, showing the large mastoid cells. Here I have also



Figs. 6, 7 and 8

Figs. 6, 7 and 8.—These three slides illustrate the bony formation surrounding the middle ear, also the Eustachian tubes penetrating the middle ear. You will note that I have passed a broom splint through the auditory canal into the middle chamber of the ear—the posterior wall being cut away, showing the location and position of the three bones of the ear—the malleus, incus and stapes in their natural positions. Also notice posterior to these bones the large cell formation anastomosing with each other, showing how little resistance there is in the passage of pus into the mastoid cells.

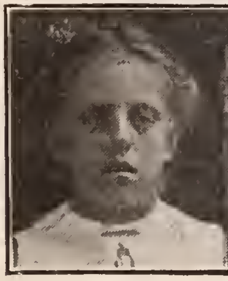


Fig. 9

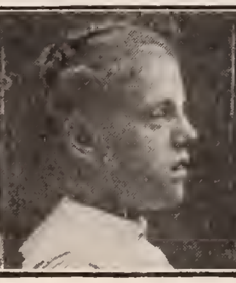


Fig. 10

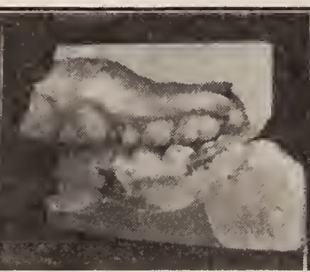


Fig. 11

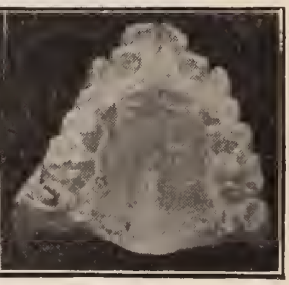


Fig. 12

Fig. 9.—Full front view of girl seventeen years old, showing pronounced adenoid features, lack of facial development, and a stupid expression, the peculiarity of the shape of the lip, owing to the protrusion of the anterior superior teeth. Also note the opening of the nasal passages, small and poorly developed.

Fig. 10.—Profile of the same case, showing more marked characteristics. Note the facial expression.

Fig. 11.—Casts of the mouth showing the occlusion in the same case.

Fig. 12.—Casts of the upper mouth of this same case, showing the pronounced V-shaped arch, high vault, lateral incisors being located almost directly back of the central incisors.

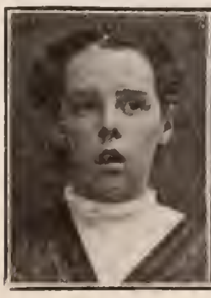


Fig. 13

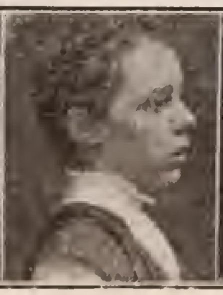


Fig. 14

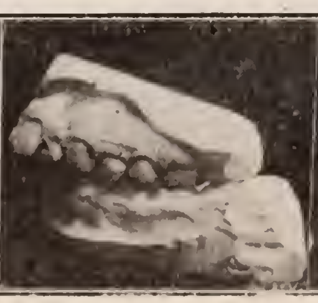


Fig. 15

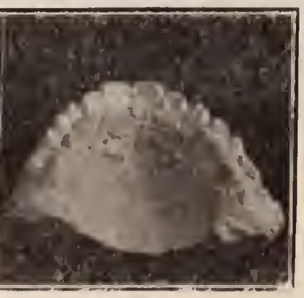


Fig. 16

Fig. 13.—Full front view of an adenoid child, eleven years of age, showing the same facial characteristics. You will also note here the lack of development of the nasal passages.

Fig. 14.—Profile view of the same case. Here you will note the lack of development of the inferior maxilla.

Fig. 15.—Casts of the same case, showing malocclusion.

Fig. 16.—Upper cast of the same case, showing the high arch, with the characteristic V-shaped formation.

passed a broom splint through these cells, showing how readily they anastomose with each other. Also showing the slight resistance against the penetration of pus.

If we were to go still farther and examine the bony structure between the mastoid bone and the brain we would find, as we approach nearer the brain, that the cell formation of the bone becomes finer, leaving a very thin partition between the mastoid cells and the brain.

In June, 1910, this child was placed in my care for dental work. I found, upon examination, the usual characteristics manifest in adenoid children. I found her extremely nervous, very susceptible to the least pain, irritable, and very difficult to manage. I called the mother to assist me and stated to her that the child showed marked symptoms of adenoid troubles, and upon examining the tonsils I found they were enlarged, inflamed, and a considerable amount of scar tissue upon the surface, showing that they had at some time given the child trouble.

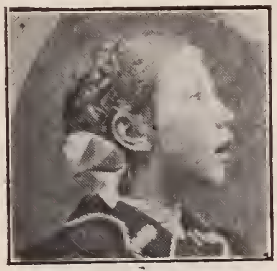


Fig. 17

Fig. 17.—Profile view of adenoid child twelve years old, showing the same marked characteristics. We find in this case the dentition retarded, also the characteristic high vault.

Upon examining her hearing I found that she could not hear a watch tick to exceed eight inches from either ear. The mother stated that she had been in very poor health for several years and had not been able to keep up with her grade for the past two years, and was unable to attend school more than half the time.

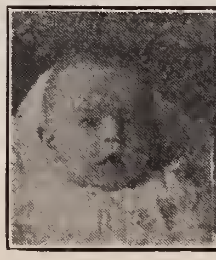
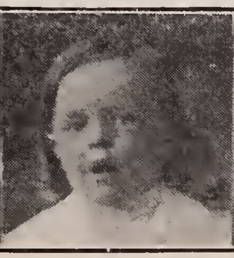
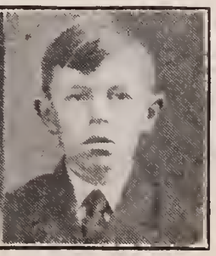




Fig. 18 Fig. 19 Fig. 20

Fig. 18.—An adenoid baby four months of age.

Fig. 19.—The same child at four years of age. You will note here that the head is thrown back, owing to the lingual tonsil impinging upon the epiglottis, which probably causes this position of the head. This child was operated upon when five years of age. Previous to his operation he had otitis media and mastoid trouble and stomatitis, and, a few months following, pneumonia and bronchitis. These, no doubt, were due to the lowered vitality of the child, caused by these pathological conditions.

Fig. 20.—Same child at twelve years of age—healthy, rugged and able to fight his own battles with the rest of the boys.

I pointed out the characteristic adenoid symptoms to the parent and what the result might be if this disease were allowed to continue, and upon advice she took the child to Dr. Belknap, who corroborated my diagnosis.

The date was set for the operation and I was called in to assist. We operated upon her at 10 o'clock A. M., removing both the tonsils and adenoids. At 4 o'clock P. M. I returned to the hospital to take the child to her home. Before leaving we tested her hearing and discovered that she could hear the watch tick at a distance of two feet from either ear, proving conclusively that the adenoid growths were the direct cause of the deafness.

I took occasion to inquire into this child's school work and found that it was as her mother had stated. About a year after this I met the parent one day and asked her in regard to the child's health. She stated that she had not missed a single day in the last year in attendance at school and had also advanced one grade, and that her last standing was equal to any pupil's in her class.

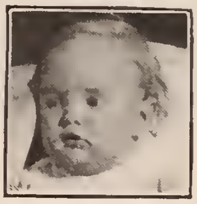


Fig. 21

Fig. 21.—This slide shows an illustration of a child two years old. When about a year old he showed symptoms of adenoids, mouth breathing, snoring, restlessness at night and repeated colds in the head. About a year later he had a cold in his head for about two weeks, followed by bi-lateral otitis media—both ear drums ruptured and discharged freely. One ear drum closed in a couple of weeks and the other discharged freely for over four months. At the end of this time good-sized adenoids were removed by the usual operation, and within a week the discharge had entirely ceased. You will note that the facial characteristics of adenoid children are not present in this case.

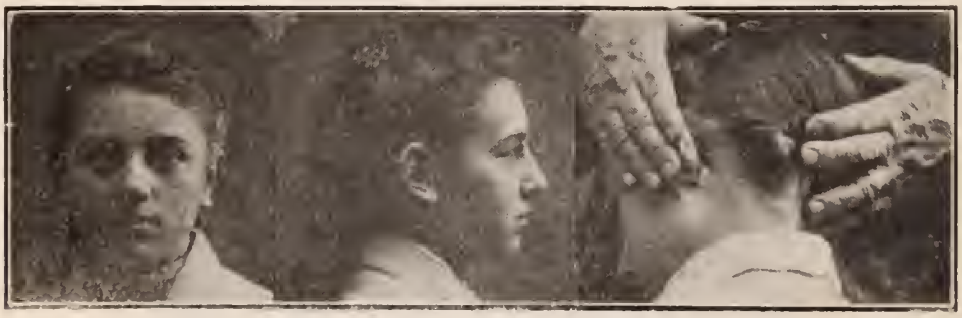


Fig. 22 Fig. 23 Fig. 24

Fig. 22.—Full front view of a child nine years old. We do not find tho marked adenoid features in this case, though a slight lack of development in the lower angles of the nose.

Fig. 23.—Profile of the same case. Here you will note a slight lack of development of the chin and lower lip. At six years of age this child was taken with otitis media in the left ear, which continued for three weeks. The mastoid was involved to such an extent that the child was taken to Ann Arbor and was operated upon by Dr. Canfield, who removed the entire mastoid bone.

Fig. 24.—This illustration shows the condition following the operation. You will note here the complete removal of the mastoid. I examined this child a few weeks ago and found a vast amount of adenoid tissue in the naso-pharyngeal cavity extending backward and downward until it was plainly visible below the soft palate. The adenoids wero not removed at the time of the previous operation owing to the critical condition of the child.

My observations have been that once a mouth-breather always one, unless broken of the habit. I have used the following home-made appliance with marked success: Have made a skull cap, of white factory, also a chin-piece so cut and fitted as to rest directly upon the chin without impinging upon the muscles of the throat or the sub-lingual glands. Then with two small buckles on each side of the skull cap, and with slight tension on these, have been able to close the mouth during sleep.

With the use of this appliance every night for about six months the child acquires the habit of nasal breathing. It is often necessary with the most pronounced cases to resort to orthodontia, and I believe it should be done in all cases if we expect to reach satisfactory results.

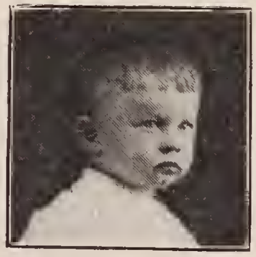


Fig. 25

Fig. 25.—An adenoid child of four years of age. There are other pathological conditions which make it impossible to operate upon this child—owing to inter-auricular or mixed circulation, or more commonly known as a "Blue Baby." Such children are of a hemorrhagic diathesis. For that reason surgical operations are contra-indicated.

Mayo uses the surgical gauze, wrapped upon the index finger, for the removal of most of the adenoid vegetations in children. Of course, in older cases, where the growth becomes tougher, they resort to the curette.

### DISCUSSION

Dr. N. S. Hoff, Ann Arbor: This is a most interesting paper. Unfortunately, I did not hear the beginning of the paper, and I do not know just what I ought to say, as I have nothing prepared. I have become much interested in the subject of the treatment of these troubles in children from an orthodontic standpoint, and also from the standpoint of the development of the teeth and jaws which contain the teeth. It also has a wider interest for us, of course, as one of the great humanitarian problems involved in these cases. We dentists realize so much more the actual conditions these people are in and how much they are handicapped not only as to the condition of their teeth but the general health conditions to which Dr. Hillman has so strongly called our attention. The general health of the child so afflicted is not only a matter of the contiguous local air cells and passages, but the physical welfare of these patients in the matter of proper breathing, eating, and their normal development is very often threatened. If a child cannot have plenty of pure fresh air to breathe and if it cannot have plenty of food and means of masticating that food, how can it develop? It is not surprising to me to hear Dr. Hillman state that these children are always irritable and exceedingly nervous and sensitive. What else could you expect them to be when they cannot take a long or comfortable breath to save their lives. All of you know how badly you feel, how nervous you get, how irritable you are when you have a cold which clogs the nasal respiratory tract, and these little folks suffer in this way all the time. It is not a temporary matter like a cold, which we get and throw off, but it is a chronic condition, and a chronic condition that really is a diseased condition involving respiration and nutrition. They never get an opportunity to breathe as they should. The decessory muscles of respiration never develop or have the proper function, consequently there is never any strength put upon the tissus which they control, neither do the maxillary bones develop, and so we have the bent and narrow arches from lack of development in the jaws which produce the crowded conditions of the bones of the nose. None of the facial bones have a chance to develop. The septum between the two tracts in the nose becomes bent to one side or the other, and we find some children almost invariably breathing through only one nostril, which is developed at the expense of the other. Those are some of the things which have interested me in this subject largely from the orthodontist's standpoint. I have found it almost invariably the case, that where we have those narrow and conspicuous arches, with the upper teeth protruding over the lower and the open mouth and the nasal passages almost occluded, that it is almost certain to be a nose through which the child does not breathe, or a nose that he makes little or no use of, and it is not much wonder to me that he becomes irritable and diseased. Diseases of the tonsils and oral membranes, as a matter of course, will develop because of breathing through the mouth continuously. The irritation of the tonsils from breathing air so dust laden through the mouth as to produce infection in the tonsils causes them to become enlarged so that the child has difficulty in breathing even through the mouth. There is difficulty in swallowing through the mouth, and all the connections opening from the mouth into the oesophagus and the respiratory tract become clogged, then inflamed and irritated. As this goes on year after year those tissues become chronically affected and we have scar tissue form, which is dense and hard, so that there is no elasticity at all of those tissues, and then children get so that they can hardly articulate distinctly on account of the binding and restriction of the tissues. Then, again, this disease spreads to infection of the other air passages about the head, the antrum becomes infected and we have antral affections, which give the dentist so much trouble. I have no doubt that many of the systemic, as well as the local diseases from which children suffer, can be accounted for from these conditions. In the young children, where the teeth are developing, we attribute a great many disturbances which they undergo to the cutting of the teeth or the eruption of the teeth. Now, I have no doubt that many of these troubles, if we did but know it, are not purely diseases pending the development and eruption of the teeth, but are the direct result of the diseased conditions of the nose and contiguous air passages or air cells leading into the nose and nasal tracts.

This subject, it seems to me, is not one that is wholly foreign to the dentist. It is one that if we as dentists would study we shall find that many times it is a matter that we ought to know a great deal more about. I do not think it is a subject that ought not to be presented at a dental meeting at all; personally, I am very grateful to Dr. Hillman for bringing the subject so ably before us. From an operative standpoint, I know little or nothing about this subject, but I know that operations are continually being made by rhinologists with desirable results following their efforts. I also know that much of our dental trouble can be attributed to these same causes, and it ought to be a matter of sufficient interest to us to become more or less intelligent about it. I have no practical suggestions that I could make, Mr. President, but I am pleased to add my word of testimony and to thank Dr. Hillman for his patient and careful work in bringing this paper to us.

Dr. Lanphear, Paw Paw: My attention has been called to an article by Dr. Hutchinson in which Dr. Hutchinson speaks of non-nasal breathing, and he gives the best article I have ever seen on that subject. I have noticed it more since that time. I had a patient eighteen years of age who was operated on at ten years of age. At that time his right ear had suppurated and broken on either eight or nine different occasions. He was in Chicago and had an operation, and since that time his ear has never troubled him. However, the scar tissue in the right ear has bothered him quite a bit. We have a young man in our town, a business man, who had suppurating ears for a long time. The doctor operated on him for adenoids, but the right ear had bothered him so long and the trouble had gone so far that the whole inner ear and drum were destroyed. If he drops water in the ear now it passes into his throat, or he can take a large mouthful of water and by placing his head in a certain position he can force it out through his ear. I think that every dentist should pay as much attention to adenoids as possible. We should notice rattling in the nose or throat, the usual conditions developing in the nose and face. I have one child who was operated on when she was two years old for adenoids. Very large ones were taken out. I had another child operated on at fourteen months; her throat was very small and the adenoids were got out with just the finger and gauze, and it was of such a mass that they filled a half of an ounce bottle. We happened to have one of those small bottles of glycothymoline empty and we put the adenoids in it and they more than half filled the bottle. I had another child that showed for about thirty days the rattling in the throat, a child two and one-half months old. It was cleaned out with gauze and the child immediately ceased opening its mouth. In the night, if sleeping on its back, he would not close his mouth, but the rest of the time he did. I want to say also that the mother and father have been troubled with adenoids all their lives, and it has gone to such an extent that the arch in the mouth of the mother has grown an inch and a half above the surface of the teeth.

**Dr. Don M. Graham**, Detroit: There is little left to say after so able a paper and so comprehensive a discussion. One thing, however, I wish to emphasize, and that is the question of heredity in the majority of these cases. I have noticed many times parents bringing to clinics children for the removal of adenoids and enlarged tonsils, when a glance at the facial development of these little ones shows that they closely resemble the underdeveloped maxillary and mandibular outlines of their parents. Even these extreme cases, happily, are amenable to treatment, and we as dentists should have sufficient knowledge of the etiology and treatment of these conditions to at least intelligently refer them. It is not expected that we should correct these deformities, but it is imperative that we know enough about the consequences of their neglect, since the removal of adenoids and enlarged tonsils, supplemented by appropriate after treatment we now know to effect marvelous results in the physical and mental development of the child. In short, the dentist who fails to comprehend his duty in this respect falls very far short of his highest professional obligation.

In these latter days we have heard much about oral sepsis, which is all too true, but we have heard little about nasal and respiratory sepsis. Has it ever occurred to you that there can be quite as much respiratory sepsis as oral sepsis? Contrary to the prevailing idea, it has been found that the greatest amount of respiratory sepsis passes into the stomach instead of into the bronchi and lungs. This fact should impress us with the necessity of giving nasal conditions more attention while not neglecting the very important question of oral sepsis, which we believe is as pronounced today as it ever was, for the reason of the vastly increased amount of dental operations, a great percentage of which is performed without due regard for self-cleansing properties.

**Dr. Blackmarr**, Jackson: I had not expected to say a word in this discussion, but I was very much gratified when I noticed on the program the name of Dr. D. M. Myers, rhinologist at the Homeopathic College at Ann Arbor, who was to open this discussion, and I wanted to hear him very badly, from the fact that I knew that he was associated with Dr. Dobson, orthodontist at Grand Rapids, and the two worked out together some conclusions in regard to the malocclusion of teeth in connection with adenoids, which would have interested you all. I was very much interested in the paper. I would like to say that I became so much interested in this subject of adenoids in our town that I got the three rhinologists so they are performing the operation for their removal for the absolutely poor children gratis, and I feel as though I had done some good Christian missionary work when I got that done: to see the little mouth-breathing children that we constantly see on the street, in the street cars, in schools, churches, theaters, and everywhere, whose parents apparently know nothing about the bad results to the child, it is really pitiful to think that something cannot be done for those children and for the parents' enlightenment.

I noticed that the essayist did not speak very much about the conditions which prevent the child from breathing through the nose. I think he might have said more about that. I think Dr. Meyers, if he were here, would have brought that out; that the child for a time after the operation for adenoids cannot breathe through the nose normally unless the teeth are in place, in a normal position, so that the lips can close normally over the teeth. The work of the orthodontist should follow that of the rhinologist.

Dr. Harry E. Loeffler, Detroit: I would like to say something in this connection; a point which has not been brought out by the essayist, and that is the importance of establishing normal breathing. In normal breathing the jaws and lips are held in position by a vacuum, a condition brought about by the act of swallowing, during which the air is expelled from the oral cavity. A child suffering from nasal obstruction almost invariably has an underdeveloped upper lip. In such cases it usually requires some muscular effort to keep the mouth closed. In order to develop the muscles of the upper lip it is considered good practice to strap the upper and lower lips together at night by means of some adhesive plaster so that it requires no effort on the part of the child to keep them closed. If this condition is not obtained the teeth, no matter what their relation may be, will sooner or later resume their original positions, because the lips will not be in a position to resist this movement. The nasal passage will again become obstructed, the old habit of mouth-breathing will be resumed, and all the work that has been done to establish a normal occlusion will have been lost.

Dr. Kelley: I did not intend to butt in, as it goes, at all, but simply came in with my brother, who is a dentist, but I am heartily in favor of all that has been said in regard to adenoids and tonsils as a cause of defects of the teeth, and of the maxilla, and there cannot be too much said about the early correction or the removal of these conditions. I think it would be a fine thing if dentists could recognize these things when they see them, because as long as those conditions exist they cause your dental troubles—your troubles with the teeth. You try to correct that end of it and you won't get much results unless you correct the cause, and your cause is behind your effect—in the adenoids generally. I think it is a very interesting subject and I think it is a subject that is very closely connected with the dental profession and their work.

Dr. Dieterle, Ann Arbor: In schools where there is medical inspection a record is kept of every child afflicted with adenoids and enlarged tonsils. The parents or guardian are urged to have these defects corrected from the time the medical inspector detects the disorder until it is accomplished. While every dentist should recognize these physical derangements, he does not operate for the condition; I think it the proper function of the physician in the schools. Let us urge the introduction of medical inspection in the schools for the attention of adenoids and enlarged tonsils.

Dr. Hillman (closing): I wish to state that I have a specimen of adenoids here in a bottle of alcohol, and I also have that bony portion of the temporal bone, and also that area of the mastoid portion here; I also have the cast of that first case of malocclusion. If anyone wishes to see them I will be pleased to show them to you.

> **No one thing does human life more need than a kind consideration of the faults of others. Every one sins; every one needs forbearance. Our own imperfections should teach us to be merciful.**
>
> —Henry Ward Beecher.

# DECISION OF THE APPELLATE COURT IN THE "TAGGART CASE."

WASHINGTON, D. C., Feb. 25, 1913.

IN THE COURT OF APPEALS OF THE DISTRICT OF COLUMBIA.

GEORGE W. BOYNTON, Appellant,
vs. } No. 2436
WILLIAM H. TAGGART, Appellee.

This appeal involves a decree in the Supreme Court of the District in an infringement suit sustaining the validity of letters patent numbered 872,978, granted December 3d, 1907, to William H. Taggart, the appellee, upon a divisional application filed July 12th, 1907, of original application filed January 18th, 1907.

According to the specification the invention relates to "a new and useful improvement in methods for making molds for dental inlays and the like." It is further stated that these molds are particularly designed for the casting of dental fillings of the type known as inlay fillings, but that "they can obviously be used for certain other types of work of a fine grade, one of their principal fields of usefulness being in the formation of other types of dental metal work, as, for instance, bridgework and the like." Searching the original specifications, we find that the phrase "certain other types of work of a fine grade" was intended to embrace the art of manufacturing special pieces of jewelry, for it is there written: "The process can also be used in the art of manufacturing jewelry, wherever it is desired to make a single piece of any kind, as for instance where a piece of jewelry is made to order. The manufacturer can carve up a pattern in wax with comparative ease, as the graven operation in wax requires neither the high class of tools nor high manual skill required for graving in metal. * * * * * After the pattern is completed in wax the process proceeds as herein set forth and an absolutely perfect duplicate can be obtained." The claims are twelve in number, of which we reproduce the following five as representative:

1. The process of making patterns for dental inlays and the like, which consists in molding plastic material upon the tooth surface to the size and shape of the desired inlay.

3. The process, which consists in making a pattern of a tooth filling within the cavity to be filled and in contact with the surface thereof, removing the pattern from the cavity, forming about the pattern a mold provided with a sprue, and melting out the pattern.

6. The process, which consists in making a pattern for a cast tooth filling within the cavity to be filled and in contact with the surface thereof, from plastic material capable of being changed from its solid condition, supporting the pattern upon a sprue former, inclosing the pattern in a primary body of mold material, supporting the pattern and primary body of mold material within a flask by means of the sprue former, adding a secondary body of mold material, removing the sprue former and removing the pattern from the mold thus formed by way of the sprue.

8. The process of making molds for casting dental fillings and the like, which consists in forming a pattern of the desired size and shape, forming a mold about said pattern with a depression in the mold adapted to form a crucible forming a sprue hole extending from the depression to the pattern and then removing the pattern.

12. The method of forming patterns for casting dental inlays, which consists in forming moldable material to the size and shape of the desired inlay in the cavity to be filled and against its walls.

An examination of these claims discloses that they do not cover, nor purport to cover, a new process for filling teeth. On the contrary, they relate solely to the process of making *patterns* out of plastic material or wax and the process of forming a mold about such pattern, from which mold a duplicate of the pattern may be produced. The words "dental inlay and the like," as used in the claims of the patent, when read in connection with the specification, as they may be read, clearly embrace "bridgework and the like." It is unnecessary here to determine whether they have even broader signification, although as previously stated, the specification specially includes "certain other types of work of a fine grade."

To produce the pattern to which these claims relate an impression in wax or other plastic material is obtained, that is to say, if a tooth cavity is to be filled wax is first inserted therein, chilled and removed. When thus removed a pattern of the filling has been obtained. Substantially the same process would be followed in obtaining a pattern for a bridge between other teeth. After obtaining this pattern, it is put upon a short piece of wire, technically called a sprue former, initially coated with investment material and then enclosed in a secondary layer of investment material. This is allowed to set when it is sufficiently heated to volatilize the wax. The mold is then completed and the gold or other metal may be inserted through the sprue hole.

We will here briefly review the prior art. It is not disputed that the art of producing metal castings by means of a mold formed of a wax pattern is very old. It is in evidence that this art was practiced by the ancient Greeks and Romans and was extensively used in the middle ages for producing statuary and other accurate casts. This process is known as the ''Cire perdue'' or ''Lost Wax'' process. See Simpson Bolland's ''Encyclopedia of Foundings,'' page 515. It is conceded that Cellini used this process hundreds of years ago in casting one of his most celebrated statues. It is further conceded that the burnished inlay process was also well known for many years prior to the application for this patent. See patent No. 402,352 to Robinson, dated April 30th, 1889. In that process a piece of platinum or gold foil is placed in the tooth cavity and rubbed or burnished against the walls of the cavity. The foil, then called a matrix, is usually filled with wax so as to conform to the original shape of the tooth, then removed and precisely the same process followed as in the Taggart process; in other words, the only difference between the burnished inlay process and the Taggart process lies in the use of the foil, which subsequently fuses with the ''solder'' or lower carat gold. The patent to Hollingsworth, No. 708,811, dated Sept. 9th, 1902, covers machines for casting dental bridges. The wax pattern in the Hollingsworth process is treated in substantially the same manner disclosed by the Taggart patent, and the casting process disclosed by Hollingsworth in no material way differs from that disclosed by Taggart. The patent to Reese, No. 200,760, dated February 26th, 1878, covers a mold for casting dental plates. It is thus seen that it was old long prior to the Taggart patent to manufacture dental castings by the Lost Wax process.

It is conceded that appellant practiced the process disclosed by the claims of the patent in suit, the defense being the invalidity of these claims. In addition to the prior art as disclosed in the patents, to which reference has been made, much testimony was introduced by appellant tending to show that the identical process disclosed by this patent was for more than two years prior to the date of the original application practiced by dentists throughout the country. Of course, if the testimony amounts to proof beyond a reasonable doubt of such prior use, the defense must be sustained, as the claims must fall. Sec. 4886 R. S.: Forncrook vs. Root, 127 U. S. 176; Peters vs. Active Mfg. Co., 129 U. S. 530. We shall here review that evidence.

Dr. Oscar H. Simpson, of Dodge City, Kansas, a dental practitioner since 1882, a graduate of the Ohio College of Dental Surgery, a member of the State Board of Dental Examiners, at one time President of the State Dental Association, and a member of the National Board of Dental Examiners, testified that he gave his first inlay clinic in about 1887, and had since given clinics at Topeka, Wichita and Newton, Kansas; at the World's Congress of Dentists at St. Louis, and at other places. The witness described his process in inlay work and further described in detail the method he employed in about 1898 to form a dental tip or crown for a boy by the name of Malcom Judd. Without going into detail, it is sufficient to say that the process described by the witness was substantially the process disclosed by the patent in suit. The original apparatus by which the process was practiced was introduced in evidence. Not only this, but the original work which had been subsequently removed after performing a useful purpose, was also introduced. While this piece of work was attacked by experts for the complainant, we nevertheless are fully convinced that the process by which it was made was the process disclosed by the Taggart patent in suit. Dr. Simpson gave other instances of employing this process in his practice. He further testified that in the clinic at Wichita, Kansas, in about 1898 or 1899, he described the method which he employed to form the Malcom Judd tip or crown. In this he was corroborated by Dr. B. L. Shobe, a dentist residing at Bartlesville, Oklahoma, who remembered very distinctly the clinic at Wichita because he then thought the process adapted to a case which was troubling him. After watching the clinic he returned to his home and tried to practice the process, but failed. He then consulted Dr. Simpson at Dodge City, learned the cause of his failure and was thereafter able to practice the process. In his testimony he gave the names and addresses of different persons for whom he did that kind of work. No matrix was employed in the clinic Dr. Simpson gave at Wichita, the wax pattern coming in direct contact with the tooth. A Mr. Lyle T. Henkel, now a locomotive engineer, an entirely disinterested witness, testified in direct corroboration of Dr. Simpson. From 1893 until March, 1897, he studied dentistry with Dr. Simpson, and his testimony is clear and convincing that Dr. Simpson during that time practiced the process disclosed in complainant's patent in making cast inlays for teeth.

Dr. Judson O. Ball, of Mt. Pleasant, Iowa, a dental practitioner since 1880, testified concerning inlay work. In about 1889 he prepared a tooth cavity, then ground a piece of porcelain to fit the cavity and cemented the porcelain in place. This was his first work of that kind. In 1894 a Mrs. Shaffer, living at Merrimac, Iowa, sixteen miles from Mt. Pleasant, came by appointment to have a Logan crown set. The crown had been ordered by mail but had not arrived. The doctor, desiring if possible to complete the work upon that occasion, took a wax impression and from it, by practicing the process disclosed by the patent in issue, produced a casting which he used successfully. He subsequently practiced the same process in the Spring of 1895 in doing work for Dr. A. O. Pitcher, of Mt. Pleasant, Iowa. Some time between 1895 and 1899 he employed the process in doing work for Mrs. William Gladden, also of Mt. Pleasant. In his testimony he described the work in detail. During September, 1903, the doctor set a large inlay for Mr. F. S. Finley, a lawyer of Mt. Pleasant. This inlay was for the right central incisor, decayed on the central proximal, involving both the facial or labial and lingual surfaces of the tooth and also the lower cutting edge surface. After the cavity was prepared, wax was inserted to conform with the labial, lingual and proximal surfaces of the tooth; in other words, a wax impression of the filling or casting was taken. A casting was then produced by a process substantially the same as that of the Taggart patent. This casting was then cemented in place and has since done service. The original apparatus by which this casting was made was introduced in evidence. The names and addresses of other parties for whom work of a similar character was done by Dr. Ball were given by the witness. Mr. Finley, formerly City Solicitor of Mt. Pleasant, Iowa, his home, testified in corroboration of Dr. Ball. He remembered that some time during the year 1903, when he and Dr. Ball were together in the City Council, the doctor had filled a front tooth for him. The witness was asked what circumstances if any impressed this particular occurrence upon his mind, and replied: ''The manner of putting this filling in was impressed upon my mind from the fact that the tooth was prepared and an impression taken of the tooth and the filling cast and cemented into place, which was different from any other filling that Dr. Ball had ever put in for me, and I inquired of the doctor at the time the filling was put in about the manner of his doing it, and he explained it to me. He told me that he had taken a wax impression of the cavity. I knew that he had done this; he then showed me the apparatus where he had set the wax filling on a point of a cone and put a cylinder over it and then used some substance something like plaster paris to get the form of the filling; he then removed the cylinder with the plaster cast, removed the metal cone and explained to me how he heated the plaster cast, or the wax in the plaster cast, and how it would come out and leave the cavity. He then filled the cavity in some way with gold, making the cast which was cemented into my tooth. I merely have his explanation as to how he made the filling aside from the fact that I knew he took the wax impression, that the filling was put in in one piece, and he showed me the apparatus where he said he had made it and explained to me the process of making it as I have explained it above.'' The witness stated that the apparatus which had been introduced in evidence was exactly the same in principle and similar in fact to the one used in making the casting for his tooth. There was no cross-examination of this witness nor was an examination sought to be made of the tooth, which the testimony shows had been filled in 1903. One, Robinson, who had been Dr. Ball's janitor for seventeen years, also testified concerning the doctor's use of the process here involved.

Dr. Valentine H. Hobson, of Richmond, Kentucky, testified to the circumstances surrounding the practice in 1889 of the process of the patent in issue. The doctor subsequently practiced the process for other patients and gave their names and addresses.

Dr. William E. Harper, of Chicago, Illinois, a man of wide preliminary training, testified to casting dental bridges by the present process and to the giving of clinics in 1893 or 1894 in which he explained it. The names and addresses of people for whom he had made cast bridges were given.

Dr. Merrill W. Hollingsworth, who as we have seen in 1902 patented a machine for casting dental bridges and who, therefore, was thoroughly familiar with the Lost Wax process in the manufacture of dental castings, testified to having made bridge castings by the process in issue as early as 1893, the names and addresses of different people for whom he had made castings being given. Dr. Hollingsworth's testimony was corroborated by Dr. George A. White.

Dr. Jacob G. Schottler, of Milwaukee, Wisconsin, a practicing dentist and also a teacher of dentistry, testified to the casting of a gold inlay in 1898 by the process in issue. This casting was for a patient who refused to have the work done in the old way owing to nervousness. The name of the patient was given.

Dr. George W. Blaesser, of Cedarburg, Wisconsin; Dr. Emil M. Kapitan, of Manitowoc, Wisconsin; Dr. John M. Higgins, of Chilton, Wisconsin, all testified in corroboration of Dr. Schottler. A Mr. Thomas H. Savage, a stenographer, testified that Dr. Schottler took a wax impression of one of his teeth that had been broken off and from this produced a tip which was cemented in place. The witness was asked in cross-examination whether he had any objection to permitting an examination of his tooth by a dental expert and replied that he did not. The record does not show that any such examination was made, however.

We come now to the testimony of Dr. George B. Martin, of Frankfort, Indiana, who has been engaged in the practice of dentistry since 1884. In 1888 Dr. Martin organized the Indianapolis Post-Graduate School of Prosthetic Dentistry and was President of the school and also its instructor, his subjects including crown, bridge and inlay work. When he took up the practice of dentistry he was already familiar with the making of patterns for metal castings in other lines of work. The doctor testified in detail to practicing the process here involved and to the disclosure of that process to his students and others. He introduced in evidence various apparatus by which his work was accomplished. His testimony covers a period from 1890 on. Dr. Blain H. Sellers, of Indianapolis, Ind., who attended the Indiana Dental College in 1891 and 1892, during the time Dr. Martin was an instructor and demonstrator of Prosthetic Dentistry, testified in corroboration of Dr. Martin. The witness was asked to describe the instruction he received in the casting of bridges and crowns, and replied: "Well, we first took the crown, made the crown to suit yourself—I always did—and then take a piece of wax and place that into the mouth and have the patient bite down onto that, and that would form the bite for the articulation, and then carve the wax any size and shape that we would want the cast itself to be. We would invest that in the plaster of paris, placing into the wax an instrument to act as a sprue, after that part of the investment became hardened we added to that another on top, and after that had hardened we removed the two pieces separate and then removed the wax from the mold, and we melt our gold and pour it into what we called the die, and then place the counter die on top of that and the impression would form the cast bridge itself." Drs. Cravens and Bloor, both of Indianapolis, also testified in corroboration of Dr. Martin. Dr. Myron E. LeGalley, of Lafayette, Ind., who was a student at the Indiana Dental College from 1892 to 1895 inclusive, testified in detail as to the instruction which he then received from Dr. Martin in the art of making cast bridges. The testimony of Dr. LeGalley is clear and leaves no room for doubt that the process of the patent in suit as applied to dental bridges was fully explained to and understood by him during the time mentioned. It was stipulated that Dr. Clarence Williams, of Terre Haute, Ind.; Dr. W. H. Upjohn, of Lafayette. Ind.; Dr. Johnson and Minnie Howes, of Indianapolis, Ind., if called as witnesses would testify exactly the same as Dr. LeGalley as to the instruction received by them while in attendance at the Indiana Dental College through Dr. Martin, their attendance upon said school covering a period between 1889 and 1897. In addition to these several witnesses, Miss Martha Vories, who was Dr. Martin's assistant for about a year commencing in 1897, testified to seeing Dr. Martin practice the process in issue. The testimony of this witness shows that she thoroughly understood the process at the time she saw Dr. Martin practice it.

Dr. Joseph Head, of Philadelphia, Pa., whose article on inlays is incorporated in the American Text-Book of Prosthetic Dentistry, who is a graduate of the Philadelphia Dental College, a graduate in medicine of the University of Pennsylvania, and a man evidently of wide experience and attainments, testified to the casting by him in the apparatus of Dr. Ball, which had been employed in making the Finley inlay of a cast inlay. Dr. Head says: "I find that the material and apparatus that I employed and which is stated to have been used by Dr. Ball, to be capable of producing an inlay as perfect as any inlay I have ever seen." Dr. Head has produced a cast gold inlay which he had made by the use of the same investment compound and apparatus used by Dr. Simpson and to which reference has been made. There is other corroborative testimony in the record, but we do not deem it necessary to review it.

Has the defense of prior use been made out? As no two cases are exactly alike, it is apparent that the character of the invention involved, the prior art, and the particular circumstances surrounding each case must be considered in weighing evidence of prior use. The contention in this case that Dr. Taggart's discovery was revolutionary in character is not sustained. On the contrary, as appears from the record art at the time Dr. Taggart applied for his patent, dental castings produced by the Lost Wax process were well known. Having this in mind, there is nothing improbable about the testimony of appellant's witnesses. Indeed, Dr. Taggart himself, according to his own testimony, was in full possession of the idea involved in these claims more than ten years before he applied for his patent. The thing that most troubled him and that deferred his patent application was the production of a machine by which the gold could be quickly and easily forced into the mold after its completion; in other words, the process of producing such patterns and molds, generally speaking, was already well known. The real difficulty, therefore, was in producing a device that would quicken the practice of the process and thus induce the profession generally to make use of it. This is apparent from an examination of Dr. Taggart's Bill in this case, wherein he states: "Your orator has expended large sums of money preparing for the market machines and apparatus with which the method of said patent can more readily and perfectly be practiced, and is now prepared to supply the demand for such machines and apparatus.'' The doctor's testimony also shows we think that it was the production of these machines that consumed time and not the evolution of the process.

The testimony which we have reviewed comes from witnesses whose standing is unchallenged in this record. Several of these witnesses are entirely disinterested. The cross-examination of nearly all of them was confined to a few questions as to the character of the investment material employed and considerable stress is laid in the brief because one of these witnesses, when recalled, failed to include in the formula then given an ingredient contained in his former answer to a similar question. We attach no importance whatever to this. In the patent itself, Dr. Taggart conclusively disproves the contentions of his counsel, that it required any special skill to evolve a formula for investment material, for he says: ''The sprue former is then used as a handle to support the pattern, and the entire pattern is covered with a primary coating of investing material. *This investing material may be any one of the various dental investing materials on the market.''* Moreover, the prior record art contained ample information concerning the investment feature of complainant's patent. The real question which we are called upon to determine from the evidence before us, is whether the various dentists who have testified, or any of them, were in possession more than two years prior to the date of the original application for this patent of the idea attempted to be covered thereby, and whether they, or any of them, gave expression of that idea in a practical and public way. It is of no possible consequence that by the use of Dr. Taggart's machine gold inlays and the like may be produced more cheaply and rapidly than they were produced by dentists who have testified. It is enough if those dentists took a wax impression in the manner described by these claims and formed a mold around the pattern thus obtained for the purpose of casting a dental inlay or the like. To hold that this was not done would be arbitrarily to disregard and set at naught the testimony of witnesses whose character and reputation are unimpeached and whose testimony is reasonable and in entire harmony with the circumstances of this case. We are unwilling to assume such a position. We are fully persuaded that the evidence shows beyond a reasonable doubt that for many years prior to the filing of the original application herein the process of making patterns and molds for dental inlays and the like, as expressed in these claims, had been publicly practiced upon many occasions. This finding avoids the patent and renders it unnecessary to determine whether the claims thereof were anticipated by the prior record art.

It follows that the decree must be reversed, with costs, and the cause remanded with directions to dismiss the Bill.

*Reversed* and *Remanded.*

(Signed) Chas. H. Robb.
Associate Justice.

The Defense Committee having the prosecution of this case in charge was represented by Messrs. Mason, Fenwick & Lawrence, attorneys, Washington, D. C. These gentlemen will be glad to furnish any additional information that may be desired by our readers.

# ANESTHESIA AND ANALGESIA WITH NITROUS OXID AND OXYGEN *

BY E. I. MCKESSON, M. D., ANESTHETIST, TOLEDO, OHIO

WE ARE SO accustomed to the benefits and protection of anesthesia in surgical work that we can scarcely imagine the condition of a patient if operated upon without it. Death by shock, from the simple amputation of a leg or an arm, was not infrequent before anesthetics were discovered, but it is of exceedingly rare occurrence since they have been used; which shows the blocking action of anesthesia on the nervous system and the protection afforded the organism.

In our remarks covering the subjects of nitrous oxid-oxygen anesthesia and analgesia, we wish to review, first, the fundamental and scientific features of anesthesia, with some of its complications to act as a background, for our remarks on the subject of analgesia as applied in dentistry.

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*Presented before the First District Dental Society at Detroit, Mich., Dec. 12, 1912.

In both anesthesia and analgesia our purpose is the relief of pain and the prevention of shock; rendering more thorough and speedy the operation with the least harm to the patient.

In a gross way, the picture of shock is seen when the patient's pulse becomes rapid and poor, the skin blanched, and the respirations rapid, with pupils more or less dilated. This condition may be produced in several ways: through fear; from comparatively trivial operations, causing pain of varying degrees; from the toxic action of certain anesthetic agents; from excessive trauma even under the influence of anesthesia; and from excessive ventilation of the blood, due to rapid respiration, but usually associated with pain.

We are still unsettled as to the exact way in which nitrous oxid produces anesthesia. It may be due to the difference in affinity of certain nerve cells for oxygen and nitrous oxid at certain partial pressures of these gases in the blood. If oxygen is not absorbed by the cell in sufficient quantities it is, of course, temporarily incapacitated for metabolic changes, and anesthesia may be the result.

However hazy the mechanism of anesthesia, the signs and symptoms produced by nitrous oxid-oxygen are very definite and pronounced.

When nitrous oxid and oxygen, in their proper proportions, are inhaled without the admixture of air, the patient in the first two or three breaths is not conscious of any change whatever, and begins to wonder what is to be expected, when suddenly the sensation of numbness and tingling in the hands and feet comes on as the stage of analgesia is reached in the third to sixth breath; about the fifth breath sounds are exaggerated, and the patient in the seventh to the tenth breath, without further warning, loses consciousness. Anesthesia, however, at this moment is not complete, since the patient by a sudden sharp pain may be brought into a semiconscious state. But the longer the patient is allowed to breathe the gas-oxygen mixture the more thoroughly will the tissues be saturated with these gases, and the less nitrogen will be contained in the blood, diluting the effects of the nitrous oxid. Thus the anesthesia becomes deeper and more prolonged if the induction period is prolonged to five minutes or so.

After the patient has been under the influence of the anesthetic for from two to five minutes some or all of the following signs of anesthesia should be present:

1. Increased respiration rate.
2. Relaxation of the muscles of the eyelids.
3. Insensitive conjunctiva.
4. Little or no pupillary reaction to light.
5. Stationary or slowly rotating eyeball.
6. General muscular relaxation.
7. Snoring.
8. Purplish pink ear lobe, finger nail, and lips.

Since the amount of oxygen in the mixture controls the depth and character of anesthesia, we are constantly required to determine whether too much or too little oxygen is being used. The following symptoms and signs aid in this determination, no one of which is infallible:

### TOO LITTLE OXYGEN

1. Muscular twitching, becoming clonic spasms or jactitation.
2. Panting respirations.
3. Retching or vomiting.
4. Progressive cyanosis.
5. Sudden blanching (rarely).
6. Dilated pupils.
7. Spastic rigidity of muscles.
8. Hesitating respiration with prolonged expiration.
9. Cessation of respiration from muscular spasm.

### TOO MUCH OXYGEN

1. Voluntary or reflex resistance.
2. Superficial slow respiration.
3. Retching or vomiting (rarely).
4. Increasing pink, becoming bright.
5. Active pupillary reflex.
6. Reflex resistance about incision.
7. Prolonged inspiration.
8. Holding of breath.
9. Talking, crying, etc.

The pulse and respiration are usually accelerated when the patient is under the influence of nitrous oxid and oxygen, but when these gases are properly administered the blood pressure is not influenced. The volume of respiration or the amount of gas inhaled at each breath is subject to considerable variation, but in the average case amounts to 500 cubic centimeters. About thirty respirations per minute is the most frequent respiratory rate. Neither the rate nor the volume of respiration means much in itself, but the amount of gas consumed per minute, which represents the ventilation of the lungs, is of importance and will be considered later when discussing the subject of rebreathing.

During anesthesia, if the blood pressure falls progressively and is accompanied by progressive increase of pulse rate, shock is developing from some of the causes previously enumerated, and appropriate measures should be taken to remove the cause instead of attempting to treat the result by the injection of strychnine, etc. On the other hand, the increased pulse rate, resulting from the administration of nitrous oxid and oxygen, sometimes increases the blood pressure in patients suffering from advanced arterio-sclerosis, and the possibility of cerebral hemorrhage in these cases should be borne in mind. So, if a patient presents himself with crooked arteries over the temples, radial artery wall hard, and added to this a subnormal pulse rate, more or less irregular, he should be refused anesthesia from any drug, unless the operation was imperative, when great caution should be exercised in the administration.

Among the difficulties during nitrous oxid-oxygen anesthesia, probably the most disturbing is due to an obstructed airway. Improper holding of the jaw, allowing the tongue to fall backward, is a frequent and the most easily remedied cause. Large corks used as mouth props may be easily dislodged so as to force the tongue backward and obstruct the airway. A rubber dam in the mouth during anesthesia for pulp removal courts difficulty from the same cause. Tumors pressing on the trachea or larynx and foreign bodies of all kinds need only be mentioned.

The results of an obstructed airway in the early stages of anesthesia, before relaxation has been obtained, are active resistance, progressive cyanosis, and possibly asphyxiation. When the airway is only partially obstructed the variation of blood pressure between inhalation and exhalation, I have found in one case to be as much as 30 mm. of mercury, which makes plain the influence of this condition upon the heart.

As a class, the alcoholic, the drug user, and the husky, robust out-of-door worker are difficult to anesthetize. For these cases more time is required to obtain anesthesia. A hypodermic of morphine grains ¼, and hyoscin grains 1-100, an hour before, is of great assistance, especially when extensive operations are to be undertaken. In abdominal surgery, local anesthesia with ¼ of 1 per cent novocain injected into the layers of the abdomen will usually obviate the necessity of using any ether with the gas-oxygen in this class of cases.

Among the elements which increase the efficiency of this anesthetic are those factors which influence the absorption of gases by the blood. Nitrous oxid and oxygen will be absorbed from the lungs more rapidly when there is a large or full respiration than when the movements are small; and when the pulse rate and blood pressure is strong, forcing considerable quantities of blood through the lungs for absorption. The anemic patient will often absorb poorly, but since the muscular tone and bodily resistance is frequently low, relaxation may be even more easily obtained in this class than in the full blooded.

## REBREATHING

The practice of requiring a certain amount of rebreathing in gas-oxygen anesthesia has become practically universal, but the theories upon which this rebreathing is based are quite varied, some advocating rebreathing to save gas, others advocating rebreathing of such an amount as to influence the pulse and blood pressure, or in other words, to the extent of beginning asphyxiation.

My reasons for rebreathing are based upon the following facts:

The normal ventilation, or the amount of air taken per minute during sleep, is between 7000 and 8000 c.c. Under anesthesia, the respiration rate is usually 30, and the volume 500 c.c., so that we obtain a ventilation of 15,000 c.c. per minute, or double the normal quantity. Now, if the patient were to rebreathe 250 c.c at each inhalation and obtain also 250 c.c. of *fresh* gas, he would then be breathing between 7000 and 8000 c.c. of *fresh* gas per minute, which is the amount he is accustomed to.

In the upper air passages, including the trachea and bronchi, there is a *dead space* containing 140 c.c. of gas, which, according to eminent physiologists, does not participate in the gaseous interchange taking place in the deeper portion of the lungs. At the beginning of exhalation, therefore, we first eliminate 140 c.c. of gas containing no carbon dioxid, to be followed by the remainder of exhalation amounting to 360 c.c., which contains about 6 per cent carbon dioxid. Now, this 140 c.c. containing no carbon dioxid, nor any other deleterious substance, is as good for respiration as the gases when they leave the tanks. Through the experimental work of Henderson and others, it has been shown that through rapid respiration and over ventilation of the blood, too much carbon dioxid is eliminated, unless rebreathing of a certain amount is required; and this lowering of the carbon dioxid content of the blood produces shock.

It behooves us to maintain as nearly as possible a *normal ventilation* in each patient, and thus forestall the development of shock from this cause. It is, therefore, my custom to determine from time to time during the anesthesia the volume of respiration in c.c. by actual measurement, and to adjust the apparatus so that the patient will receive at each breath enough fresh gas mixture, which, multiplied by the rate of respiration, will amount to between 7000 and 8000 c.c. per minute, and whatever amount he over-breathes, this he is required to rebreathe. The patient who does not over-ventilate or uses less than 8000 c.c. per minute should, of course, not rebreathe. The following table shows the amount of fresh gas to be taken at each breath, at the various rates of respiration, in order to obtain a normal ventilation:

| Resp. Rate | | Fresh Gas | | Normal Ventilation | Resp. Rate | | Fresh Gas | | Normal Ventilation |
|---|---|---|---|---|---|---|---|---|---|
| 15 | X | 500 c.c. | = | 7500 c.c. | 35 | X | 210 c.c. | = | 7500 c.c. |
| 20 | X | 375 c.c. | = | 7500 c.c. | 40 | X | 175 c.c. | = | 7500 c.c. |
| 25 | X | 300 c.c. | = | 7500 c.c. | 45 | X | 165 c.c. | = | 7500 c.c. |
| 30 | X | 250 c.c. | = | 7500 c.c. | 50 | X | 150 c.c. | = | 7500 c.c. |

## ANALGESIA

What we have stated in a general way concerning nitrous oxid anesthesia applies, either directly or with slight modifications, to the same agents when used in the first stage, ordinarily known as analgesia. So I shall deal with the subject of analgesia as used in modern dentistry from a purely practical standpoint.

Analgesia may be produced in exactly the same way as we begin an ordinary nitrous oxid-oxygen anesthesia, but as soon as the stage of analgesia is reached, which is accomplished in about six breaths, we arrest the further development of anesthesia by diluting the mixture of nitrous oxid and oxygen with air. In actual practice, as I shall show you in the clinic following this paper, the mixing valve is set arbitrarily for 7 per cent oxygen, 93 per cent nitrous oxid, the rebreathing bag set for 250 c.c. and the gas tanks opened. The nasal inhaler is then applied and the patient instructed to breathe through his nose until by pinching himself he feels no pain and experiences the sensation of numbness of the tongue and teeth, and a tingling sensation sometimes felt, especially in the hands and feet. He is then in the stage of analgesia, which may be maintained in a large majority of patients by breathing every third breath through the nose, and breathing air through the mouth the other two breaths. In about 90 per cent of the cases no further adjustment of the apparatus or attention will be required until the work has been completed.

The percentage of oxygen administered should total the same as the amount taken by the patient in ordinary conditions, or 20 per cent, but when two breaths are air and the third breath nitrous oxid he will obtain from the air two-thirds of the oxygen necessary for his three breaths, or 13 per cent; then, by the addition of 7 per cent of pure oxygen in the apparatus he obtains 20 per cent, or the amount he is used to breathing. If less air is taken and more gas required to maintain analgesia in a given case, the oxygen must be increased in the same ratio as it is diminished from the lack of air. To use more oxygen does no harm, but it does no good and is a more expensive dilutent than air.

If a small child is to be analgized, the valve for rebreathing is shut off and only fresh gas administered, because their tidal respiration is very small.

Many types of patients will necessitate variable methods in technic, which must be worked out for each type. We have the *fearful* patient, who needs to take the inhaler himself to experiment a time or two to gain confidence. We have the *curious* patient, who wants to take nitrous oxid and oxygen in all of its stages for the experience. We have the *sleeper*, who has the idea that he can have a nap while you do his dental work, and then we have the *stubborn* patient, who always does the thing you do not want him to do; he breathes through the nose when instructed to breathe through the mouth; and vice versa, and so requires the operator to control *his* stage of analgesia by adjusting the air valve on the nasal inhaler. The great idea for the patient is co-operation, which, happily, is usually secured without difficulty.

The preparation of the patient for an analgesic should be: abstinence from food for at least three hours previous: emptying of the bladder; loosening of all tight clothing, corsets, etc., and instructions in the method of breathing through the nasal inhaler until a tingling or numbness is felt, and then breathing through the mouth to prevent the further development of numbness. It is often a good plan to allow the patient to *take* the nasal inhaler and inhale through it for three or four breaths, to get the sensation which has been explained to him, before any attempt to do actual work is made.

The posture should be so that accumulations of saliva, dust, etc., will not readily run down the throat, but come forward and be removed by the ejector. If it becomes necessary to adjust a rubber dam in the mouth, it necessitates the dilution of the mixture with the air valve by the operator himself, since the patient is then only able to breathe through the mouth. The patient indicates by raising his finger or hand when pain is felt, so that the operator may adjust the air intake at the nasal inhaler and administer a richer mixture until deeper analgesia is secured.

In analgesia I find it best not to insert a prop because it annoys and tires the patient and prevents the closing of the mouth, which is an early sign of too deep analgesia.

### TECHNIC

In order to make the technic more explicit, let us assume that I am to administer an analgesic to you. All preparations as to food, clothing, etc., having been carried out and the apparatus in position, you take the chair. After examining the cavity it is found that considerable pain will be caused in the proper preparation, and you are advised of this, but told that at a slight increase in expense you can take nitrous oxid and oxygen through the nose while I prepare the cavity without pain. A conversation then ensues in which I explain that you take the analgesic yourself but do not go to sleep, and know everything that goes on and can even feel the work being done, but without pain. There is a slight tingling in the feet and hands sometimes, but this entirely leaves you when you breathe air through the mouth. You consent to pay the price and have the work done without pain.

The mixing valve on the head of the apparatus is set for about 7 per cent oxygen and 93 per cent nitrous oxid. The nasal inhaler is now adjusted over the nose with the rubber band about the head, and while the large rubber tube is inserted between the pads of the head-rest as a support and carried up over the head you are breathing through the nasal inhaler and becoming accustomed to its presence. Before connecting the tubing and the inhaler I will see that the exhaling valve is unscrewed, so as to allow it to play back and forth freely, and close the air valve next to it.

If I think you are apprehensive or a little nervous about the procedure I will say, "Now, we are ready to let you try a little of the nitrous-oxid-oxygen. I will give you only three or four breaths and then you can breathe through your mouth," and as I am saying this I connect the tubing and inhaler; and while you are taking these three or four breaths I so adjust the tubing that it does not drag the inhaler out of apposition with the skin at any point. "Now breathe through your mouth awhile. Did you notice any sensation?" You answer, "I didn't notice any, or slightly." "Now try it again and breathe through the nose until you feel a slight tingling in your hands and feet, or until you feel a sort of numbness coming on, and pinching yourself doesn't hurt; then breathe through your mouth and through your nose alternately and keep yourself in that condition while I prepare this cavity."

*Now* I must watch carefully or you will keep on breathing through the nose until you are unconscious, so I ask you to raise your finger when you begin to feel numb, and then I see that you get started properly in the method of breathing through your mouth and through your nose, as I directed. Once this is accomplished three-fourths of the battle is over. I begin with the work and as it proceeds I say to you, "If at any time you have a twinge of pain take an extra breath or two through the nose and it will disappear."

The first cavity has been prepared, but the next one, which is a great deal worse, will probably be more sensitive, and as I begin I say, "Now breathe a little more through the nose"; which you do, and I begin on the second cavity. Perhaps you have reached the stage where you do not care to co-operate with me and like the effects of the mixture and continue to breathe through the nose until you are actually asleep. I keep saying, as you close your eyes, "Keep awake; do not go to sleep." You do not answer, and by this time your mouth begins to close, and I know that you have refused to follow instructions, so I just open the air valve in the inhaler and keep on working while you are coming out. Then I close the air valve and you start over again. After the work is finished no extra oxygen is given, but the inhaler is removed and you sit still about five minutes, when you are ready to leave the office.

# THE TECHNIQUE FOR MAKING ANALYSIS OF THE SALIVA*

BY H. CARLTON SMITH, M.D., D.D.S., BOSTON, MASS.

Before making use of any technique for saliva analysis, it is quite necessary to have some saliva upon which to work and the method of collecting the sample will influence the results obtained.

I would recommend, for part of our work at least, that saliva be collected by connecting a small wide-mouth bottle with the tube of your saliva ejector, before saliva reaches the water. Another sample from same patient, if convenient, may be collected in usual way by chewing paraffin.

By use of apparatus here pictured (Fig. 1) I have found that samples collected as above will show between two and three times as much carbonic acid gas collected by second method as by the first.

My method for sulphocyanates is practically that recommended by Dr. H. C. Ferris except that I precipitate protein substances by a few drops of strong HCl and filter. Then compare color reaction obtained with Ferric chlorid with the sample and with 1 cc. of a standard KCyS solution.

In taking viscosity of saliva my only point is that the constriction of the tube shall be jacketed so that conditions may be constant and accurately duplicated.

The apparatus (Fig. 2) is standardized with water and used with a stop-watch at a temperature of 25° C.

*Clinic at Northern Ohio Dental Society, 1912.

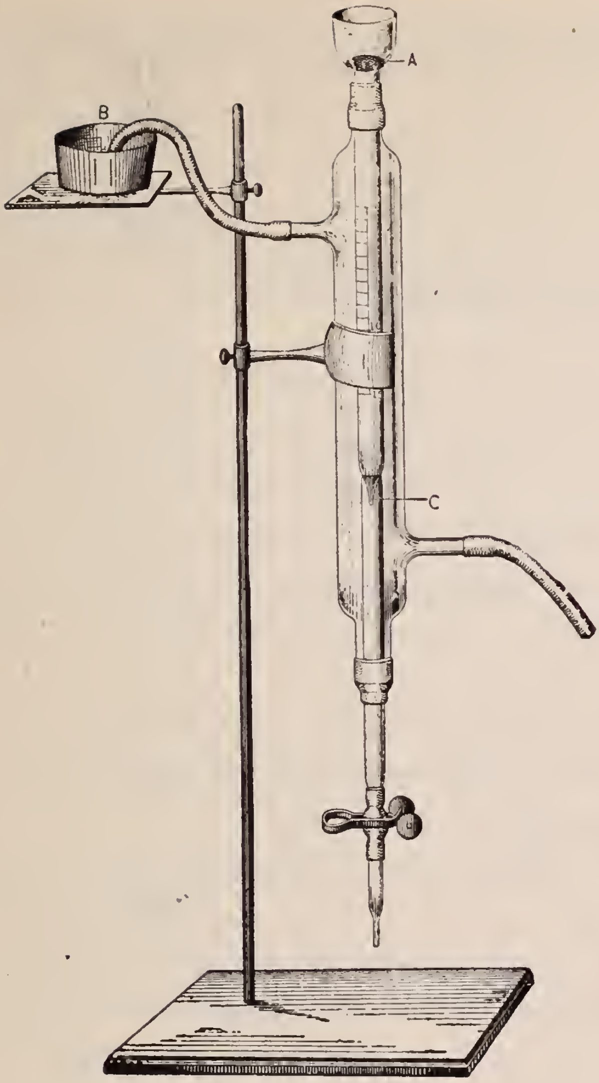

Fig. 1

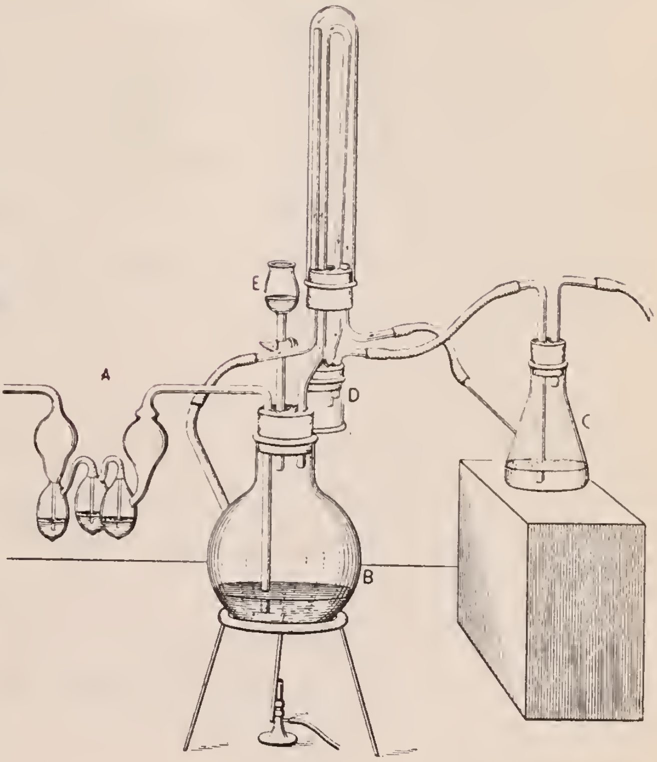

Fig. 2

Thistle tube (E) is used to introduce water or acid into (B).

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## RELIEF FUND.

The following is a copy of a letter to be sent to dentists throughout the country by the Relief Committee of the National Dental Association:

Dear Doctor:—Are you acquainted with the effort of the National Dental Association to establish a fund for the relief of its aged and unfortunate members?

Are you in full sympathy with that movement?

If familiar with the scheme thus far, you are aware that the first step was the endeavor during the present year to carry out the plan endorsed by the National Dental Association at Cleveland in 1911. That plan was to ask each state society to increase its annual dues to one dollar per member, and set aside the sum thus obtained for the relief fund.

The committee appointed at Cleveland endeavored to get the question before all the state societies at their last annual meetings, but coming at the same time that we were asking them to increase their dues for the purpose of entering the National Dental Association under the reorganization, we met with much opposition. The question was not put to a vote in a number of cases because it was feared we would hinder the reorganization movement. We were received with words of encouragement everywhere, but thus far we have only two states committed to our plan, namely, Tennessee and Colorado. Several of the other states were almost persuaded, and we hope they will vote the measure at their next meetings; therefore, we shall keep up our efforts to carry out the original plan.

We have been assured that this plan will not carry in some states, for various and sundry reasons, and many opposed to it have asked to be allowed to make voluntary annual contributions instead.

Some few noble spirits have already set the example by sending on to the committee their first assessment. This encourages us to come to you and ask if you will join this generous few, and agree to give annually a small sum to the relief fund. This is not to be "something thrown away, never to be heard of again," but it is going to create a fund to insure our members against want in sickness and old age. You may yourself become a beneficiary, or may live to see it help some dear professional friend in time of distress.

Will you, then, send us your name and the sum you are willing to contribute, or will you not save time and correspondence by enclosing your check at once for the first annual payment?

Make your check payable to H. B. McFadden, of Philadelphia, treasurer of the National Dental Association. You may rest assured the distribution of the relief fund will be in the hands of those who will thoroughly investigate all applications for help. Every precaution will be taken to guard the funds and utilize them for no other purpose than the relief of worthy dentists.

Will you not ask your professional friends to join you in this movement?

Will you not lend us your aid and influence to get our plan adopted by your state society?

Will you not call upon the members of the profession in your city, and request them to contribute what they can? Will you not advise us, giving names of those you call upon, saving us further correspondence and them future annoyance?

Fraternally yours,

L. G. Noel,
Edward S. Gaylord,
W. T. Chambers,
*National Relief Committee.*

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We now have in press a new book upon Interstitial Gingivitis and Pyorrhea Alveolaris, by Eugene S. Talbot, consisting of over 300 pages and 102 illustrations. This work is based entirely upon original research and is of interest to every dentist, since it discusses the subject from every point of view.

# EDITORIAL

## Scientific Foundation Fund and Oral Research Campaign.

The National Dental Association has created a new department in its organization, that of National Dental Scientific Research, and has appointed a committee consisting of Dr. Weston A. Price, Cleveland, O.; Dr. A. R. Melendy, Knoxville, Tenn., and Dr. C. M. McCauley, Abilene, Texas, to organize the department and secure funds for its maintenance.

The purpose of the National Dental Scientific Foundation Fund is to provide competent men and facilities for exhaustive investigation of some of the most urgent unsolved dental and oral problems; also to assist in the organization and work of local dental research clubs and the establishment of National recognition in the form of prizes for the best contributions to the profession.

The plan is to provide an immediate annual fund equal to at least $1.00 from each member of the dental profession, to be paid annually for five years.

There should be an average of $5.00 per year for five years from each member of dental societies to make up for the many who cannot be reached or will not be interested.

The committee has already had placed at its disposal the use of thoroughly equipped research laboratories for the use of research work without expense except for the investigators and incidentals.

The committee has also been getting options on the services of some of the country's best research men, and has found available some of the best qualified men in the various branches of oral and dental science, among them men who have an international reputation, who will devote all or a part of their time to the most careful and exhaustive dental research.

All that is now needed to bring this large group of earnest, competent men and these proffered laboratories together is an equivalent of one dollar a year for five years from each member of the dental profession of the United States.

Dr. Chas. Mayo, in his splendid paper read before the recent meeting in Chicago. January 31st, made the statement that *"It is evident that the next great step in medical progress in the line of preventive medicine should be made by the dentists. The question is: Will they do it?"*

It is a remarkable fact that oral diseases, which afflict a larger percentage of humanity than any other and which cause more total suffering directly or indirectly, have had probably the least provision made for their exhaustive investigation aside from the private effort and independent sacrifice of individuals who do it at night after a day of exhausting professional toil.

Practically all of the great epoch-making advances in medical science have been the result of definite laboratory research, and were only made possible by money advanced and a professional spirit back of it that was determined to know the unknown for the betterment of suffering humanity.

The committee reports that the responses to its first request have exceeded expectations and it indicates that the members of the dental profession are going to take an active interest in the worthy undertaking. For example, when the work was presented, by request, before the Cincinnati Dental Society, on January 24th, 1913, every member present contributed, making a total exceeding $2,500.00, or $500.00 a year for five years. When presented to a group of dentists in Cleveland, on January 28th, fifteen pledged $2,000.00, or $400.00 a year, for five years. (The full subscription from the Cleveland Dental Society is not yet taken.)

It is a most worthy movement and should receive the support of every dentist who considers himself a professional man.

Every organized dental society—city, county, and state—should appoint a local committee on the Scientific Research Foundation Fund with a local treasurer, who shall receive, receipt and forward all subscriptions to the National Chairman, who will receipt for the funds as received.

The subscription forms are designed for a card system of bookkeeping, and furnish the following: A subscription form with provisions for receipting yearly payments on the original, the National Chairman's receipt; the local treasurer's memo card for recording annual payments on pledges; a form to be sent to the National General Secretary for his duplicate record; the local treasurer's receipt and the local treasurer's remitting memo.

Will you not, good readers, help the dental profession establish this exhaustive oral research and thus have, as a profession, the credit for the work, the control of the work and the consciousness of fulfilling in part our great obligation to mankind?

For further information and subscription blanks, write to the Chairman Scientific Foundation Committee, Dr. Weston A. Price, 10406 Euclid avenue, Cleveland, Ohio.

## Testimonial Banquet to Dr. Truman W. Brophy

The testimonial banquet tendered Dr. T. W. Brophy by the Chicago Dental Society on Saturday, February 1st, 1913, was one of the most noteworthy gatherings ever assembled to honor a member of the dental profession.

Dr. J. H. Prothero, president of the Chicago Dental Society, was chairman, and Dr. Arthur D. Black toastmaster.

Toasts were responded to as follows:

Personal Reminiscences—Dr. C. N. Johnson, Chicago;

In the East—Dr. Edwin T. Darby, Philadelphia;

Abroad—Dr. N. S. Jenkins, Paris;

In Canada—Dr. George F. Bush, Winnipeg;

From the Medical Fraternity—Dr. W. A. Evans, Chicago;
Avocations—Rev. W. M. Lawrence, Hamilton, N. Y.;
Response—Dr. Truman W. Brophy, Chicago.

Gifts and compliments from many nations formed an important part of the testimonial banquet.

Among the gifts bestowed was a bronze bust of Abraham Lincoln, made from life by Volk in 1860, given by The American Dental Society of Europe; an antique silver tray from the International Dental Federation; a bust of Dr. Chapin A. Harris, founder of the first dental college in 1839, at Baltimore, from Dr. Vincenzo Guerini of Naples; a chest of silver from New York friends; twenty-one silver plates, of which Ohio contributed four, from friends in many cities of the United States and Canada; and a chest of flat silver from the Odontological Society of Chicago.

As vast as was the assemblage and as numerous the tokens of remembrance, they were all deserved, and more. To thus honor him to whom honor is due, while yet living, is sweeter than a mountain of flowers over the remains of one who has passed away forever.

# CORRESPONDENCE

## A LETTER FROM CALIFORNIA

You ask me, "How do you like the West?" I can answer that question in a single word—fine. Then you would ask, "Why do you like the West?" Now that is a different question, and I stop and think and ask myself, "Are the chances better here for a dentist?" No, we have the same kind of dentists here they have in the East. We have the twenty-year guarantee, we have 22k gold crowns for $5.00—none-better-at-any-price, and also the "I-never-hurt-a-bit" and all the other little fakes that go to make up a city. Yet I am glad I came to the Coast, and I have done fairly well.

Now, you might ask, "Would you advise your friends to come West?" And I can say, "No, not for business; and while I like the city, you might not." Then, there is that great nightmare, the State Dental Board, to pass on your fitness to practice in this State, and all boards are bad when you are trying to pass their examinations. Besides, it is a serious question to change locations. When you go to a strange city, I might say we start life over again. And while it gives us a chance to change some of our ways and not make the same mistakes, yet we are sure to do some things we had better left undone. This brings to my mind the words:

"Show me the man who never makes mistakes and I will show you a man who has done nothing." And so we go along life's beaten path and profit by our mistakes and the mistakes of others, getting a little pleasure out of our successes and trying to forget our mistakes, wishing we could do something to promote the success of our profession and thus add something to make life and our profession better for our having lived and taken part in this great game called LIFE.

Very truly yours,

Los Angeles, Cal. G. B. SPEER, D.D.S.

# NEW PUBLICATIONS

*An Introduction to Dental Anatomy and Physiology, Descriptive and Applied.* By Arthur Hopewell-Smith, L.R.C.P. Lon., M.R.C.S. Eng., L.D.S. Eng., Prizeman of the Royal College of Surgeons of England, Lecturer on Dental Anatomy and Physiology, Dental Surgeon, and Demonstrator of Practical Dental Histology at the Royal Dental Hospital of London; Member of the Faculty of Medicine of the University of London, etc. Large octavo, 372 pages, with 340 new and original illustrations, including a frontispiece in photogravure and 5 plates. Cloth $4.00, *net*. Lea & Febiger, Publishers, Philadelphia and New York, 1913.

The author says: An attempt has been made in this book to place before the reader the essentials of dental anatomy and physiology, and in consonance with the requirements of a utilitarian age to indicate those aspects of such a subject which may have some direct practical bearing upon the science and art of dental surgery.

A further endeavor has been made to endow an admittedly unattractive topic with some degree of interest and to create in the mind of the reader an atmosphere of regard which the contemplation of the anatomy of the teeth deserves and demands. Surely even a halo of romance can be found, if looked for, in this study, so closely is it interwoven with the natural history of man and animals on this planet.

The mission of the book is to explain how it comes about that man has a certain number of teeth, to describe their functions—combined, individual, component—to relate the method of their implantation, to detail their growth and the origin of the complexities of their patterns, and to narrate the role they play in the economy of Nature generally, and their close association with other portions of the body.

Odontology is a subject of prime importance to both dental practitioners and students, and this is true not only for scientific reasons and for the practical purposes of dentistry, but also because the teeth by their physical characters and enduring natures have been, are, and may at any time be of the greatest value in medico-legal cases in which much happens to be involved. As a means of identification the teeth, when exhibiting the results of surgical interference, have been found to be of enormous importance; and in criminal cases their silent testimony may prove or disprove a legal argument.

The profession is to be congratulated upon the appearance of this new work by one of the foremost authorities in the world. It is of a high order of scientific merit, systematic, and yet sufficiently compact to be of value to the busy practitioner. The illustrations, of which there are 340 original ones, in addition to 5 plates and a frontispiece in photogravure, are unusually large and clear, and form a very handsome feature of the work.

*Surgery and Diseases of the Mouth and Jaws. A Practical Treatise on the Surgery and Diseases of the Mouth and Allied Structures.* By Vilray Papin Blair, A.M., M.D., Professor of Oral Surgery in the Washington University Dental School and Associate in Surgery in the Washington University Medical School. St. Louis: C. V. Mosby Company, Pub., 1912. Price $5.00, *net*.

The author states that in spite of all the work that has been done in the study of the teeth and allied structures, the ordinary standard of surgical treatment given to diseases and deformities of the mouth does not equal that attained in other regions.

This is due largely to a rather general lack of reciprocity of ideas and observations between constructive workers in the medical with those of the dental profession. It was with the hope of presenting their more pertinent observations and deductions in a coordinated scheme that this work was undertaken. This attempt, the author says, has been made possible by the untiring efforts that his many associates in the dental profession have always made to help him solve cases that contained dental problems.

For the benefit of his dental students certain chapters on surgical pathology and surgical principles have been included. As hemorrhage is often a serious matter in mouth operations, this has been considered at some length.

The subjects treated cover thoroughly the affections of the oral cavity and are in part as follows: Physical Examination, Anatomical Consideration, Inflammation, Infections, Tumors, Cysts, Preparation of Hands, Sterilization of Instruments, etc.; Hemorrhage, Shock and Allied Complications, Wounds and Injuries of the Soft Parts, Injuries of the Teeth and Alveolar Process, Fractures of the Jaws, Clefts of the Palate, Obturators, Artificial Vela and Speech Training, Repair of Acquired Defects in the Lips, Cheeks and Palate, Irregularities in the Growth and Relations of the Jaws, Diseases of the Temporomandibular Joint, Extraction of Teeth, Infections of the Teeth, Peridental Tissues and Jaw Bones and Treatment, Diseases of the Maxillary Sinus, Tumors, Excisions and Resections of the Jaw Bones, Cancer, Tic Douloureux, Local Anesthesia, General Anesthesia, etc.

The chapters on Fractures of the Jaws and Deformities and Malrelations of the Jaws are of special interest from a dental standpoint.

The whole subject is well presented in a concise but forceful manner, and the illustrations, of which there are 384, are exceptionally good, many being photo engravings.

The author and publishers are to be congratulated on the production of such a work.

*The Practice of Dentistry. A Practical Treatise Upon the General Practice of Dentistry, Operative and Prosthetic, Exclusive of Orthodontic Practice.* By Leo Greenbaum, M.D., D.D.S., formerly Dean and Professor of Clinical Dentistry, Materia Medica and Anesthesia in the Philadelphia Dental College, and Max Greenbaum, formerly Quiz Master in the Philadelphia Dental College. New York and London: D. Appleton & Co., 1912. Price, $6.00, *net.*

Believing that a work purporting to treat of the general practice of dentistry—exclusive of orthodontic practice—constitutes at the present time a distinctive need of the general dental practitioner, the authors and publishers have prepared this book. The subject matter has been treated to meet the practical requirements of the active practitioner, who in many instances fails to acquaint himself with the most advanced developments in his profession because he is disinclined to wade through the multitudinous detail to be found in text-books prepared for the education of beginners in dentistry and which is generally regarded as being quite necessary for the proper elucidation of the text to be impressed upon the dental novitiate, but which is neither necessary nor impressive for the experienced practitioner.

The work is characterized by a degree of homogeneity not to be found in works completed under separate authorship.

The authors state that they have spared no effort to bring this work up to the accepted advanced standards of dental practice and to present the subjects as concisely as in their judgment appeared prudent. About 450 pages are devoted to operative dentistry and about 350 pages to prosthodontia, including crown and bridgework. The text is illustrated with 350 cuts. The book is well printed in large type that is easy on the eyes and well bound, as are all books from this well-known publishing house.

*The Prevention of Dental Caries.* By J. Sim Wallace, D.Sc., M.D., L.D.S., Dental Surgeon and Lecturer on Dental Surgery and Pathology London Hospital, Hon. Dental Surgeon to the West End Hospital for Nervous Diseases. Second Edition. London: The Dental Record, Alston House, Newman St. W., Pub., 1912. Price 1/6, *net.*

This is a logically written little book full of sensible suggestions regarding the cause and prevention of dental caries, a subject in which everybody should be vitally interested. The author maintains that while bacteria are instrumental in producing decay of the teeth, it might be more exact to say that carbohydrates are the existing causes for it is only when carbohydrates lodge unduly that micro-organisms are excited to acid fermentation. The author says that if no carbohydrate lodged in the mouth the bacteria which are best adapted for that medium would be present only in innocuous numbers—probably many species would be prevented from proliferating in the mouth altogether—while the bacteria which find in the albuminous desquamated epithelium and other proteid substances their natural foods might actually be antagonistic to the presence of acid-forming and possibly also to pathogenic bacteria. Still keeping to the view that the bacteria are to be regarded as the exciting cause of caries, we recognize that the foods control the bacteria. Fibrous foods which stimulate efficient mastication clean the bacteria out of the mouth altogether to a great extent. By stimulating mastication they remove sticky carbohydrates, remove also the nutriment which is most necessary for the development of bacteria most active in a carbohydrate medium, i. e. (a) acid-forming bacteria, and (b) bacteria which give rise to vicious fermentation.

Further, the author says, that while by no means claiming that the mouth could be sterilized, we may at least say that the foodstuffs can control the micro-organisms so effectually that the teeth of civilized man may be as clean and free from caries as are the teeth of the lower animals or certain savage races which do not use any artificial methods of cleaning the mouth. It is a book well worth perusing.

# SOCIETY ANNOUNCEMENTS

## The Panama-Pacific Dental Congress

As one of the attractions of the Panama Pacific International Exposition, a Dental Congress, international in character, to be known as the Panama Pacific Dental Congress, is to be held in San Francisco, California, beginning on the last Monday in August, 1915, and continuing for ten days.

A Committee of Organization has been perfected, including representatives from the Pacific Coast States—California, Oregon, Washington, Utah, Idaho, Colorado and Arizona.

This committee is now actively engaged in perfecting the work of organization, including the establishment in every State of the United States and every foreign country, where dental organizations are known to exist, of executive committees, which will be empowered to promote the business of the Congress by bringing it to the attention of their National, State and Local Societies, and securing memberships and contributions to the program.

The American Society of Orthodontists and the National Dental Association, of the United States of America, have already made arrangements to meet in San Francisco in 1915 as parts of the Congress, and invitations will be extended to other dental societies to take similar action.

The Panama Pacific Dental Congress is the first organization to apply to the Exposition management for space for exhibits and to ask that a definite time be set aside for its meeting.

Manufacturers of dental goods have signified their intention to maintain during the Congress the greatest exhibition of dental supplies ever held; ample space for this purpose has already been promised by the Exposition authorities, and we are assured of their hearty co-operation in all things pertaining to the success of the Congress.

The membership fee has been fixed at ten dollars, and the finances of the Congress are being cared for by a corporation, formed within the Committee of Organization, and known as the "Pacific Dental Congress Commission of 1915."

Over $8,000.00 has already been subscribed for promotion purposes by the dentists and dental societies of the Pacific Coast States, and this fund will be increased by many thousands of dollars before the Congress meets.

Ample funds for the promotion of the Congress are assured, and in due time committees on local arrangements, transportation, exhibits, clinics, program, etc., will be appointed, and everything possible will be done to ensure the success of the Congress and make it in attendance and scientific and professional interest the greatest dental congress ever held.

The whole world is coming to San Francisco in 1915 to participate in and enjoy the Panama Pacific International Exposition, which will commemorate the completion of the world's engineering masterpiece, the Panama Canal.

Never in the history of the profession has there been so auspicious a time for holding a great dental congress, and the Panama Pacific International Exposition Company and the Committee of Organization of the Panama Pacific Dental Congress unite in a cordial invitation to the members of the dental profession to come to San Francisco in 1915 to attend the Congress and view the wonders of the Exposition and Pacific Coast of the United States of America.

## The Northern Ohio

The fifty-sixth annual meeting of the Northern Ohio Deental Association will be held at Cleveland, June 5, 6 and 7.

## Illinois State Board of Dental Examiners

The semi-annual meeting of the Illinois State Board of Dental Examiners, for the examination of applicants for a license to practice dentistry in the State of Illinois, will be held at the Chicago College of Dental Surgery, corner of So. Wood and W. Harrison streets, Chicago, beginning Wednesday, June 4th, 1913, at 9 A. M.

All applications, together with the fees, twenty-six dollars ($26.00), must be filed with the secretary at least five (5) days prior to date of examination. Address all communications to

T. A. BROADBENT, *Sec'y.*,
705 Venetian Bldg., Chicago, Ill.

## The Mississippi Dental Association

The thirty-eighth annual session of the Mississippi Dental Association will be held at Meridian, June 24, 25 and 26, 1913. A fine program is promised and an invitation is extended to all ethical practitioners to meet with us. DR. L. B. PRICE, *Sec'y.*,

Corinth, Miss.

## Indiana State Dental Association

The fifty-fifth annual session of the Indiana State Dental Association will be held in the Claypool Hotel, Indianapolis, May 20-21-22, 1913.

The officers of the association recently met at Indianapolis and perfected plans for a three-days' "Post Graduate Course." The very best instructors and specialists are being secured for each day.

The course will be as follows: Tuesday, "Humanitarian Dentistry"; Wednesday, "Preventive Dentistry"; Thursday A. M., "Prosthodontia"; Thursday P. M., a great table clinic. The clinic will be held in the hotel.

No tuition fee for the members of the association or visitors from outside the State who are in good standing in their State Association, but all others desiring to take this course must arrange their tuition fee with the secretary. OTTO U. KING, *Sec'y.*

Huntington, Ind.

## Arkansas State Board of Dental Examiners

The next meeting of the State Board of Dental Examiners will be held in Little Rock, Ark., April 7th and 8th. All applicants are required to pass an examination to obtain a certificate. Examination fee $15. For application blanks apply to the secretary.

E. H. JOHNSON, *Sec.-Treas.*,

305 Citizen's Bank Bldg., Pine Bluff, Ark.

## Fiftieth Anniversary Susquehanna Dental Association

The fiftieth anniversary meeting of the Susquehanna Dental Association of Pennsylvania will be held at Irem Temple, Wilkesbarre, Pa., Tuesday, Wednesday and Thursday, May 20, 21, 22, 1913. All ethical practitioners are invited.

The Executive Committee is made up as follows: Doctors A. E. Bull, T. W. Thomas, W. E. Davis, B. A. Courtright, A. J. Heffernan, Wilkesbarre; A. B. Miller, Kingston, and I. H. Jennings of Danville.

EDMOND J. DONNEGAN, *Rec. Sec.*

## Meeting of the Texas State Dental Association

The thirty-third annual meeting of the Texas State Dental Association will be held at Temple, Texas, May 15, 16 and 17, 1913. The clinics will be in charge of Dr. J. O. Hall, Waco, Texas, who will furnish any information relative to same. Exhibitors desiring space will please address Dr. J. M. Murphy, Temple, Texas. All ethical members of the profession are cordially invited to attend the meeting. Any other information will be cheerfully furnished by the secretary.

Guy Morgan, *Pres.*, Paris, Tex.
J. G. Fife, *Sec'y.*, Dallas, Tex.

## Lake Erie Dental Association

The fiftieth annual meeting of the Lake Erie Dental Association will be held at Hotel Bartlett, Cambridge Springs, Pa., May 15, 16, 17, 1913. This meeting celebrates the Golden Anniversary of this Society, and the Program Committee have arranged for the best meeting ever held.

Entertainment for the ladies. Come and bring them.

C. L. Mead, *Sec'y.*,
Union City, Pa.

## Ohio Valley Dental Society

Middleport, O., Feb. 7.—The dentists of Meigs, Athens, Vinton and Gallia counties met at the Carnegie Library at Middleport yesterday for the purpose of forming a dental society, the following responding to the call: Drs. A. W. Paffenbarger, McArthur; C. S. Shumaker, C. J. Zimmer, Amy Whaley, R. B. Church, Pomeroy; H. C. Foster, Racine; M. D. Hartinger and I. B. Hodge, Middleport; W. C. Feltman, Vinton; E. W. Shaw, J. A. Lupton and L. C. Cowden, Gallipolis; J. N. Brown and E. B. Holmes, Albany; L. G. Bean, W. S. Murray and W. W. Lee, Athens. The meeting was called to order at 1:30 P. M. by Dr. Edward C. Mills, of Columbus, and Dr. Perry B. Clark of the dental department of Starling (Ohio) Medical College, Columbus, gave a lecture on "The Preparation of Cavities."

It was decided that the name of the new organization should be the "Ohio Valley Dental Society," and the selection of officers resulted in the following persons being named: J. A. Lupton, Gallipolis, President; J. N. Brown, Albany, Vice President; E. W. Shaw, Gallipolis, Recording Secretary; M. D. Hartinger, Middleport, Corresponding Secretary; R. B. Church, Pomeroy, Treasurer.

Meetings will be held first Thursday of every month except July and August, the next meeting being appointed for Thursday, March 6, at Athens.

At the evening meeting the members of the organization were initiated into the mysteries of the Order of the Flea.

**You are not likely to cheer the hearts of men by looking down in the mouth yourself.**

# NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

## WHAT IS DOING IN THE SOCIETIES

### A New Component of the Ohio State

Athens, Ohio, Feb. 7.—Dr. E. C. Mills, of Columbus, visited Middleport last night for the purpose of assisting the dentists of Athens, Gallia, Vinton and Meigs Counties in organizing a component of the State Society. The following officers were elected: President, J. A. Lupton of Gallipolis; vice president, J. N. Brown of Albany; recording secretary, E. W. Shaw of Gallipolis; corresponding secretary, M. D. Hartinger of Middleport; treasurer, R. B. Church of Pomeroy.

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The proposed new dental law for Michigan has been presented to the State Legislature. It is by no means certain of speedy passage, as an organization of dentists is forming in Detroit to oppose it at every step. The new organization claims that it will have a membership of over 100, composed largely of advertisers and others not members of the State or District Societies.

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### Institute of Dental Pedagogics

At the annual meeting of the Institute of Dental Pedagogics, held at Pittsburg, Pa., January 28, 29 and 30, the following officers were elected for the ensuing year: President, D. H. Squires, Buffalo, N. Y.; vice president, Fred W. Gethro, Chicago, Ill.; secretary-treasurer, J. F. Biddle, 517 Arch street N. S., Pittsburg, Pa. Executive Board—H. M. Semans, Columbus, O.; S. W. Bowles, Washington, D. C.; A. W. Thornton, Toronto, Canada.

The next annual meeting will be held in Buffalo, N. Y., during last week of January, 1914.

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### Butler County Dental Society

At the January meeting of the Butler County Dental Society the following officers were elected for one year: President, Frank Fisher; first vice president, A. R. Hammerle; second vice president, P. A. Krucker; treasurer, Frank Craven; secretary, David E. Sheehan.

The Butler County Dental Society has forwarded an invitation to Dr. Sidney J. Rauh of Cincinnati, O., to address the Society and others interested in the formation of a free dental clinic in the city of Hamilton. Dr. Rauh has kindly accepted and will address a meeting shortly to be held in the rooms of the Chamber of Commerce in Hamilton.

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Carson City, Nevada, Jan. 31.—A bill has been introduced in the legislature relating to the practice of dentistry and is aimed at what is called the ''dentist trust.'' Under the present law there is a board of dental examiners which is supposed to examine applicants for licenses, but which cannot be forced to hold such examinations. The purpose of the Harrington bill is to make such examinations compulsory. It further provides that graduate dentists of other states coming here, who have had more than five years' experience, shall be allowed to practice in Nevada until such time as the first examination for licenses is held after their arrival.

---

An organization composed of students and office assistants is being formed in Iowa for the purpose of amending existing dental laws, so as to permit any man or woman who has spent five years in dental offices as assistants to secure a license to practice, without college training and without examination. Two years ago such an act came within seven votes of passing. Now, it is said, the same forces are preparing to descend on the present Legislature. It is believed, however, that the menace of the bill is more thoroughly understood, and that the danger of allowing dentists to practice without being properly examined and licensed by the State Dental Commission would be quickly realized. In the past few years sanitary precautions and hygienic practice are more common and the protection of the public health is given more attention than ever before.

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Cincinnati, Jan. 25.—The Cincinnati Dental Society last evening gave a banquet at the Business Men's Club in honor of Dr. Weston A. Price of Cleveland, President of the Ohio State Dental Society. Seventy-five members were present. Dr. Price delivered an address on dental practice.

# THE DENTAL SUMMARY

The Magazine That Helps

Vol. XXXIII APRIL, 1913 No. 4

OFFICIAL ORGAN

The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office; 1255 Neil Avenue, Columbus, Ohio
L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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Neither the editor nor publisher is responsible for the views expressed by authors in the reading matter published by THE DENTAL SUMMARY

# REGULAR CONTRIBUTIONS

## THE TECHNIQUE OF CASTING

### USING STEELE'S INTERCHANGEABLE TEETH AND BACKINGS.

BY DR. C. E. TALBERT, COLUMBUS, OHIO.

I SHALL not advance any theories or suppositions in the paper which follows, but will give merely a plain statement of facts which have been proven by several years of experiment and daily practice.

The technique of casting a crown or bridge, using Steele's interchangeable teeth and backings, is practically the same, up to the point of investing, as that of a crown or bridge that is to be completed by soldering, the only difference being that the backings and other parts to be cast upon must be *fluxed* in the manner as hereinafter described, and that the waxing must be more carefully done and the piece carved just as it is desired to have it when finished.

Let us take, for example, an incisor Richmond. You are supposed to have the coping and pin in place, either in the mouth or upon a model. It is imperative that the pin be either of platinum or iridio-platinum, as a base metal, such as platinoid, will often become disintegrated and weakened. Select the proper tooth and grind to place, preserving the bevel of the ridge-lap, or increasing it a little if necessary, so that when the grinding is completed it will touch the coping at its extreme labio-cervical point only, leaving a V-shaped space between the two. Now place the tooth upon the backing and trim the latter to the tooth, closely on the sides, but leaving it a little longer than the tooth at the incisal edge. Next grind the ridge-lap end of the backing to the tooth, giving it the same bevel. Remove the backing and, grasping it with a pair of soldering pliers, hold it so that the beveled end will be level, and place a tiny speck of 20k solder on the corner of the backing farthest from you, as in Fig. 1. Hold in the flame until the solder sweats down, but remove before it flows. Next take a piece of 34-gauge pure gold or a piece of platinum foil slightly wider than the backing and long enough to balance on the end thereof, with enough material projecting over the ridge-lap to cover the end of the tooth when the latter is in place (Fig. 2). Have this piece perfectly flat so that when it is laid upon the end of the backing it will have a three-point contact, viz: the little globule of solder, the opposite corner of the backing, and the end of the post. Carry carefully to the flame and hold steadily until a slight movement of the piece indicates that the solder has flowed and the piece settled to place. Now put the tooth on the backing and be sure that it goes easily to place without forcing, not only at this time but after all subsequent operations of soldering or casting. If there is found to be any obstruction, remove it carefully before proceeding farther. Now trim around the cervical edge, but leave that portion of the flap that overlaps the backing, which is to be burnished down closely, as is also that part which covers the end of the tooth (Fig. 3). Drop the piece, while hot, in pickle and leave for a few minutes. It will then be ready for the flux. The flux

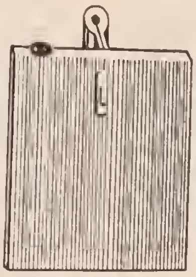


Fig. 1

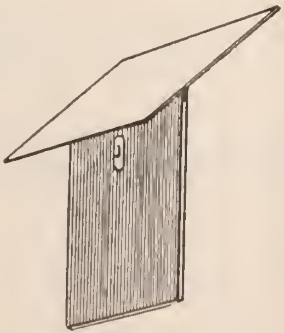


Fig. 2

to be used—and it is the only one that can be used successfully—is a saturated solution of boracic acid in grain alcohol. This is also a most satisfactory flux for all small soldering operations.

To prepare a stock solution, fill a bottle about one-fourth full of boracic acid and fill up with alcohol, shake a few minutes and allow to settle, using only the clear liquid. If you have a considerable excess of the powder, the stock can be kept up by occasionally refilling with alcohol. The best way to apply the flux is from an office preparation bottle with a small camel's hair brush, or the piece can be dipped bodily into it.

Take the piece to be fluxed in a pair of soldering pliers and apply the solution. Ignite the alcohol from the flame and allow it to burn off. Then hold the piece in the flame a moment—until you see the deposit fuse, but do not allow it to approach a red heat. Allow it to cool spontaneously and you will find the surface uniformly covered with a thin film of flux that can be handled without displacement and which, in the subsequent operation of casting, will absolutely prevent oxidization of the surface to be cast upon. No care need be taken to keep the flux from the face of the backing, nor is any antiflux or other stop-out necessary, as in the case of a soldered piece, as the investment used, if properly applied, answers every purpose.

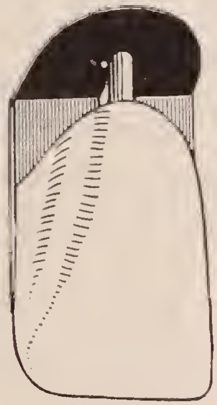


Fig. 3

We are now ready to proceed with waxing up the case. Unlike the casting of inlays, the wax to be used is of little importance except as regards its tenacity in holding the parts together and the facility with which it may be carved. A good, sticky-wax is best to unite the parts so that they may be removed from the mouth or the model. The operation may then be completed with pink baseplate wax, which carves very nicely, or with any of the casting waxes on the market. Flow on enough wax to give the desired contour and build the incisal edge to a thickness about equal to No. 20-gauge plate. Trim the wax flush with the end of the backing, which, as previously mentioned, must be slightly longer than the tooth. This is with the object of protecting the porcelain when the piece has been finished and finally mounted, which object may be still farther advanced by grinding the porcelain very thin, thus precluding the possibility of contact with the occluding tooth. After grinding, the porcelain may be repolished with gloss sticks or other polishing material.

Of course, the entire Richmond or bridge dummy, including the backing and post, may be cast in one piece if desired, in which case the method of procedure would be first to grind the tooth into place, either in the mouth or on the model, and then remove and either thoroughly wet or oil the slot and back of the tooth. Then flow on, to the proper thickness, some good casting wax, being sure to have the slot well filled. After chilling it may be waxed to place, carved as desired, the tooth removed and the case proceeded with as hereafter described. There are some serious objections to this method, however, the chief of which are, first, the difficulty of removing and replacing the tooth without distorting the post or backing, and the fact that after casting the post will fit the slot so closely as to preclude proper cementation when the case is completed. Furthermore, no matter how carefully the piece may be invested, there is almost certain to be some minute globules of gold cast along the post or upon the ridge-lap or backing, which would cause considerable trouble in removing.

Some of these objections may be removed by using the posts for casting which are supplied by the manufacturers, but the danger still remains that the post may be gotten out of alignment or otherwise displaced or the backing distorted. In view of these considerations, I strongly recommend the use of the backings, as supplied by the makers, in the manner already described.

The investment of the piece is next in order, and the *investment material,* next to the *flux,* is of the utmost importance. I shall not enter upon a discussion of the qualities necessary to a good investment, but will give you the formula for, and the method of preparing, that which I have selected as the best, after several years' trial of most of those now offered by the dealers. It is composed of four parts by weight of finely powdered silex and one part of French's *impression* plaster. These ingredients must be thoroughly mixed by repeated siftings. I sift them twenty to thirty times through a fine sieve and make up enough at one time to last several months, as the longer the mixture is kept the better it is, provided it is stored in a dry, warm place in *wooden boxes,* the wood tending to absorb any slight moisture it may contain. Too much importance cannot be attached to the mixing and curing of this investment material.

The operation of investing the piece is practically the same as that of investing an inlay. Place the sprue wire so that it points directly into the V-shaped space between the ridge-lap apron and the coping, and mount the piece on the crucible-former. Mix a tolerably thick batter of investment and paint it onto the piece with a very small stiff brush, working it well under the backing post and very carefully excluding even the minutest air bubbles. After the piece is well covered, place the casting ring on the base and proceed to pour the balance of the mix, being careful to add but little at a time, and working it down around the sides of the flask with a small cement spatula, and by holding the flask firmly down and tapping the sides with the spatula handle.

The correct proportions of investment material and water for a proper mix, as well as a sufficient amount to fill the ordinary inlay flask, are 12 dwts. of investment and two teaspoonfuls of water. You double this quantity for a larger flask. Procure a small tin ointment box, and after weighing this amount shake it well down level and trim the box to the level of the material; you will then have a correct measure for all subsequent mixes.

When the investment is set, which will be in about eight minutes, warm and remove the crucible-former. Grasp the sprue wire with a pair of hot pliers, holding it so for a few minutes that the heat may be transmitted to the wire, when it may be easily withdrawn. Place the flask on its side on an inclined rack, about two inches above the opening of a Bunsen burner, with the sprue opening at the lowest point—that the melting wax may to a certain extent drain out. Have the flame turned as low as possible. It should not be more than half an inch high, as shown in Fig. 4.

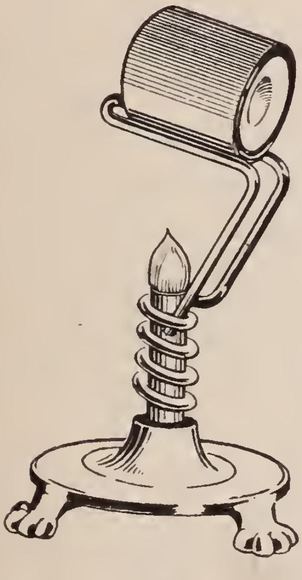


Fig. 4

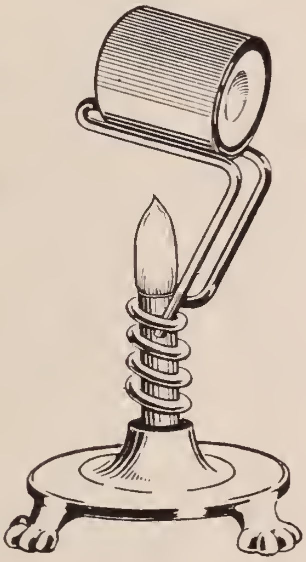


Fig. 5

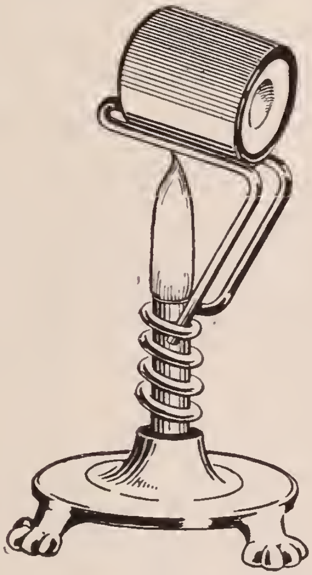


Fig. 6

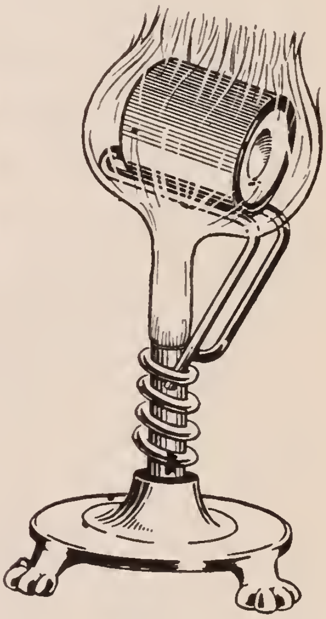


Fig. 7

Keep at this point for twenty-five minutes, at the end of which time turn it up to about an inch (Fig. 5). At the end of five minutes more turn up until the flame barely touches the flask (Fig. 6), and after another five minutes turn on the full flame (Fig. 7). After five minutes more it is ready for the cast. To summarize: Twenty-five minutes for the first heat, five minutes for the second, five minutes for the third, and five minutes for the fourth—forty minutes all told. Have the air and gas so regulated in the burner that it will burn with a slightly yellow flame rather than a noisy blue one. The flame during the last heat will then lap entirely around the flask instead of splitting off at the sides. At the end of the time allotted for the heating the flask should show slightly red, but the investment not at all, and it must be removed from the fire and the cast made without allowing it to cool longer than is necessary while preparing to melt the gold.

The gold to be used in casting must necessarily be of considerable lower carat than that which it is to be cast upon. It has generally been conceded that the solder sold for use with 18k plate is good enough for a soldered bridge. At any rate, it is the highest carat that can be safely used in casting upon 20k gold or platinum alloy backings. If you wish to use a finer gold you must have pure gold or pure platinum backings. Before fusing the solder for making the cast it must first be melted into a nugget upon a charcoal block, using plenty of borax and applying only just sufficient heat to accomplish the purpose. Do not attempt to use less than four dwts. of solder for casting a Richmond, and more in the same proportion for a bridge, as it is important to have plenty of excess. Note carefully the sluggish action of the solder under the blow-pipe so that you may be able to judge when fusing for the cast just when the fusion is complete, as it will not dance and boil as a higher grade of gold usually does. Also after casting, the pressure must be sustained a little longer than is necessary when using a higher grade of gold.

The technique of casting a bridge does not differ materially from that of a crown, except that provision must be made for easily removing it from the model and a greater number of feeders supplied.

Before pouring the impression any shell crown must be partly filled with wax and the posts of Richmond crowns partly covered so that by slightly warming they may be readily removed and replaced after cleaning. The model must then be slightly oiled between the abutments with liquid vaseline or other oil, and the case proceeded with as in case of a soldered bridge. This, however, is one of the methods often used in soldered work.

After the case is waxed and carved as it is desired to have it reproduced, there is nothing more to do but to fix the sprues and proceed to invest the cast.

The feeders must be at least three in number—one wire placed about the center and two feeders formed by little rolls of wax, one at either end of the bridge converging to the free end of the wire and waxed to it with a hot spatula. It may now be mounted upon the base or crucible-former and proceeded with as previously described.

In conclusion, I will recapitulate the more important considerations:

*First.*—The method of fluxing, which has not to my knowledge been published before, is *absolutely essential* to a perfect union between the metal cast and the metal cast upon and will invariably produce that result.

*Second.*—The investment must be one that will not shrink or check and one that will spread with a brush like paint and fill in smoothly without bubbles.

*Third.*—The case must not be overheated—the merest approach to redness of the flask is permissible, but the gold within must *not* reach the red heat. This result will be closely approximated by following the formula for heating as given, but by experiment may be changed to suit any slight difference in the burner used.

*Fourth.*—If solder is used in casting much caution must be used not to overheat in fusing, but be sure it *is* fused and cast as soon as you are certain that it is.

If these four essential features are carefully observed there will be few, if any, failures.

# THE RELATION OF THE OCCLUSAL AND INCISAL SURFACES OF THE TEETH TO THE ROOT CANALS.

BY HERBERT J. SAMUELS, D.D.S., OAKLAND, CAL.

WORKING on the hypothesis that there should be a normal and fairly definite relation between the occlusal and incisal surfaces of the teeth, and the entrance to the root canals and their direction, investigation was made with the idea of establishing a method whereby the position of the openings of the root canals, and, in a general way, their direction or inclination might be easily, and with some degree of certainty, ascertained without too much destruction of tooth structure.

The subject is presented in a series of diagrammatic drawings, with explanations. These drawings have been made from ideal natural specimens or normal types, and from composite pictures, when necessary to convey the thought desired. Unusual cases, peculiar conditions of arrangement, unnatural positions, or freaks are not considered at this time, and the illustrations are merely diagrams for the purpose of delineation — not actual pen-pictures of the parts.

Nor is an attempt made to reduce the anatomy of the parts to mathematical relation. A general relation, as is pictured here, does exist, however.

Make a careful distinction, in this study, between the *entrance* or *opening* of the canals and their *direction.*

Fig. 1.—This represents an outline plan of full normal dentures, showing outline of crowns just below contact points, and cross sections of roots about half way between cervix and apex. The view is as if both jaws were laid on a horizontal plane and one could look perpendicularly down upon them.

Fig. 2.—A vertical section through both jaws showing relation of occlusal planes of the molar teeth compared to the median line. Note the longer buccal cusps, which compensate for the tipping or slant of the teeth, the upper occlusal surface facing outward and the lower inward. A line drawn perpendicular to the occlusal plane is *not* parallel to the median line.

Fig. 3.—This drawing was made from a mandible placed in the usual position of a patient before the operator. One can readily distinguish three occlusal planes, and the general direction of the root is perpendicular to these planes. The planes of the lower teeth face inward.

Fig. 4 illustrates the actual and apparent direction of the root canal in upper incisors. A bur placed at the lingual pit and as close to the incisal edge as possible will enter the canal, cutting it at a slant, shown by the green line, and leaving a portion of the canal in the crown. (This may account for the darkening of crowns after removal of pulps.)

Fig. 5.—Here are shown three characteristic types of upper central incisors and two types of lateral incisors. These were drawn from several dozen extracted specimens and may be said to represent the general outline of upper incisor teeth.

Fig. 6.—(A straight hand piece is shown in the sketch. This does not mean that these teeth are to be operated on with such instrument. It is used merely to better convey the line of direction.)

Fig. 1

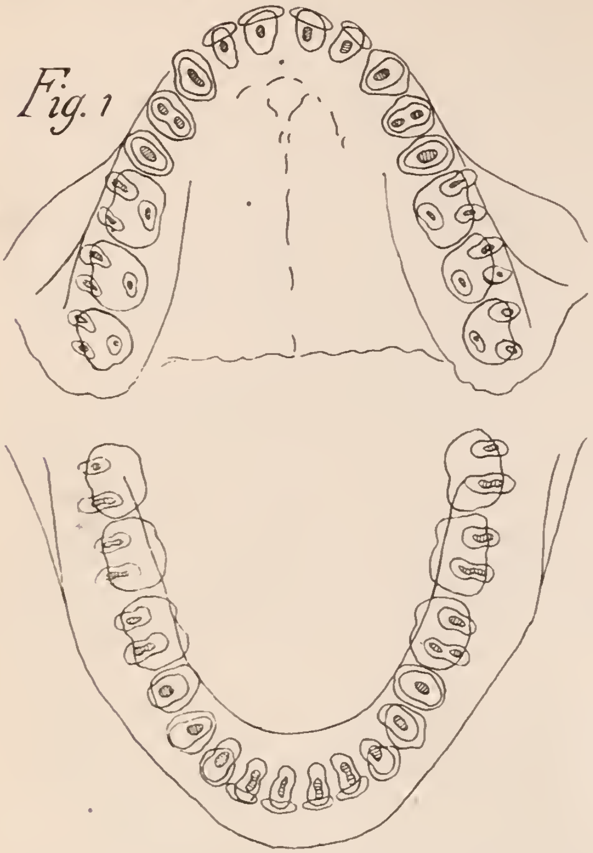


Fig. 2

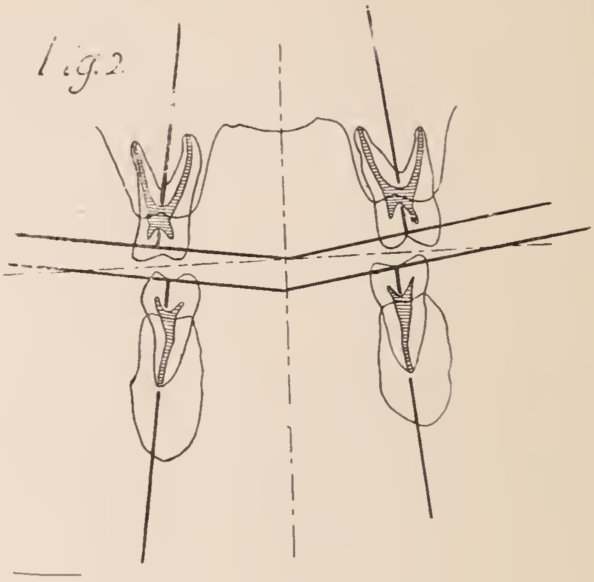


Fig. 1.—Diagrammatic plan of full normal dentures, showing outline of crowns just below contact points and cross-section of roots about half way between cervex and apex.

Fig. 2.—Section through upper and lower jaws, showing relation of occlusal planes of the molar teeth as compared with the median line.

Fig 3

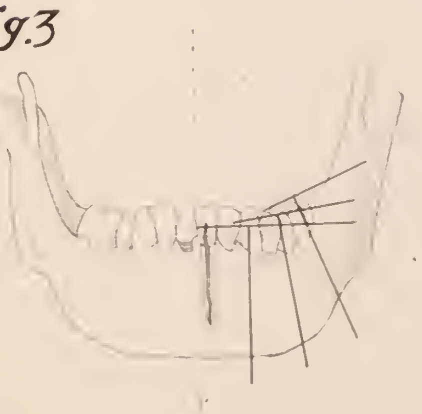


Fig. 4

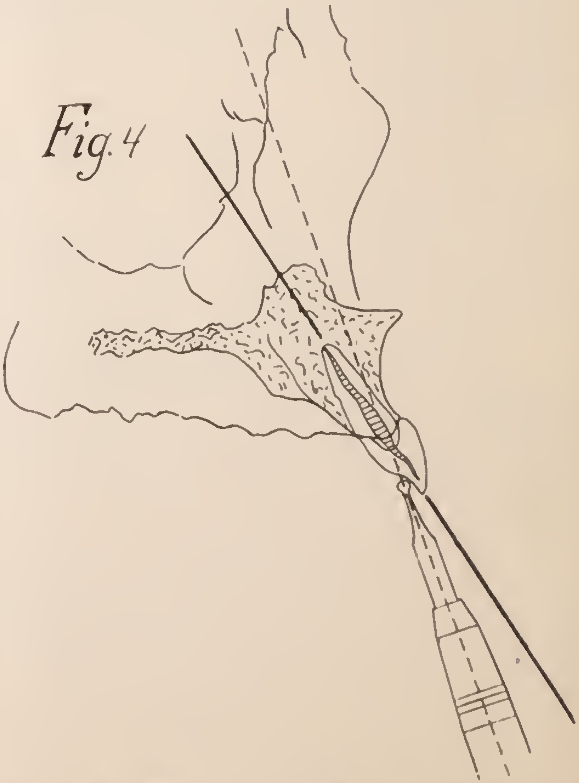


Fig. 3.—Shows the occlusal and incisal planes of the lower, as in looking into the mouth.

Fig. 4.—Vertical section through upper jaw, showing inclination of central incisors and direction of entrance. Compare with Fig. 5.

To enter the lower anterior teeth (incisors especially) the bur is directed as shown in sketch, at about the lingual pit. This cuts off a certain portion of the pulp, more or less, that lies in the crown, and if the bur were continued in the same direction, would cut through the root.

Compare Fig. 4 with Fig. 1—take the upper central incisor. As you look down on to the arch the root canal appears to lie directly under and to the posterior of the incisal surface. So it does, as shown in the plan; but, looking at it as it really is in relation to the tooth, it is directly in line with the apex and incisal surface.

Fig. 5

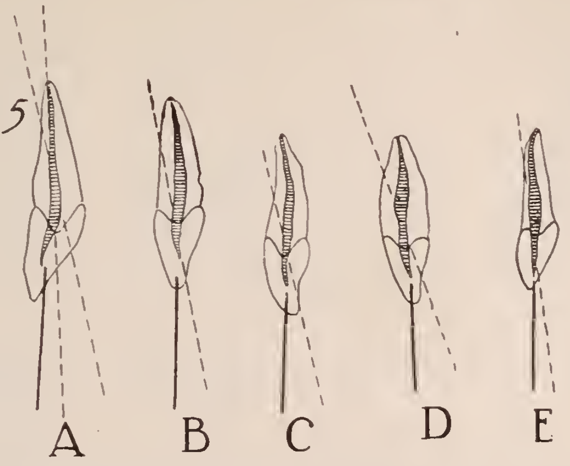


Fig. 5.—A B C, three characteristics of types of upper central incisors; D E, two types of lateral incisors.

The opening should be approached from a point in line with the direction of the canal. This is not always practical—sometimes it is impossible.

Fig. 6

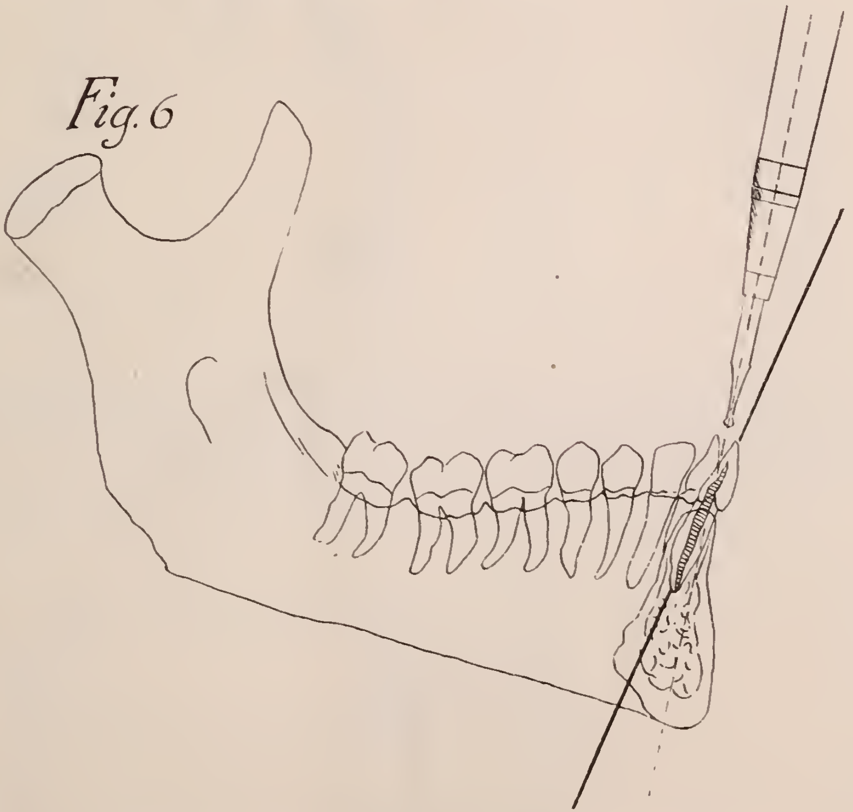
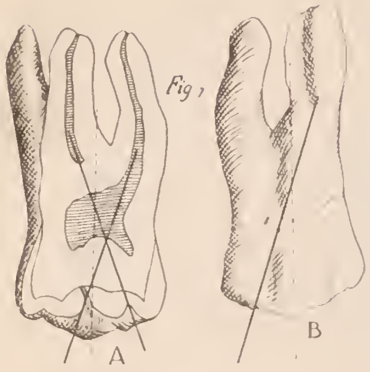


Fig. 6.—Left half of lower jaw, showing inclination of incisors and usual direction and point of entrance.

Compare Figure 5 with Figures 4 and 6.

Fig. 7.—An upper right second molar of good average form. A line continued in direction of the opening of the disto-buccal canal would perforate the floor of the pulp chamber. The direction of the canals is shown by the lines. Note their position on the crown.

Fig. 8 shows a plan of a cross-section of the crown of an upper right molar at about the gingival line, and the relation of the four surfaces of the tooth to the cross section. Note that the opening at A is *not* the *direction* of the canal whose opening is at A.



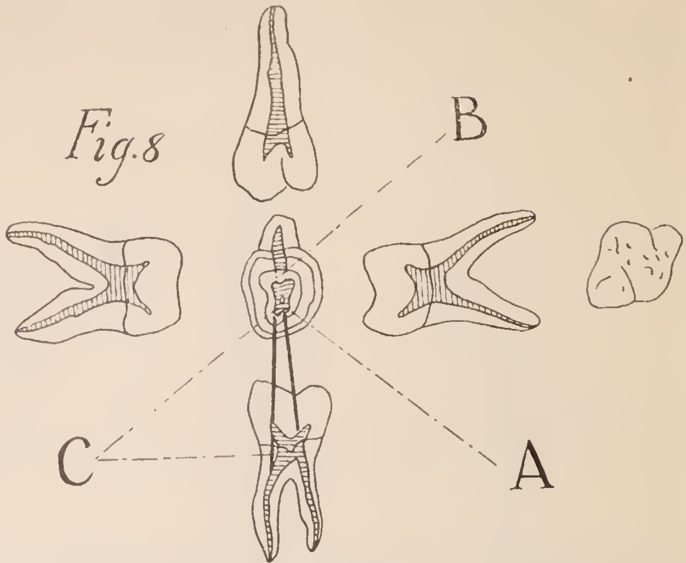
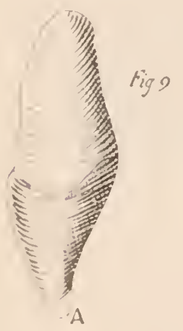
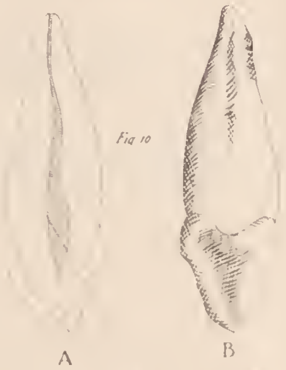


Fig. 7.—Upper right second molar. A, buccal surface ground to show canals; B, lingual view. Compare with Fig. 16.

Fig. 8.—Four views of an upper right molar in relation to a cross-section of its crown at about the gingival line. Note the clear view of the opening into the disto-buccal canal at A. The openings into the lingual B and mesio-buccal (C) canals are hidden by overhanging walls of the pulp chamber.





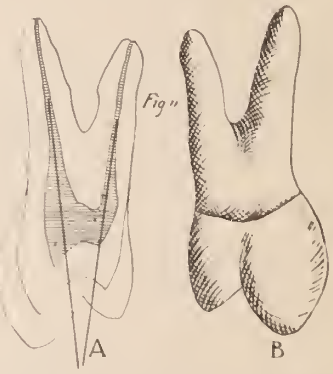
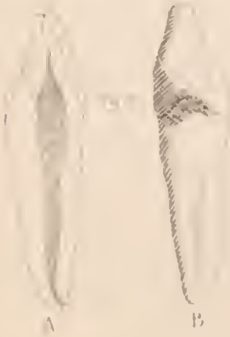
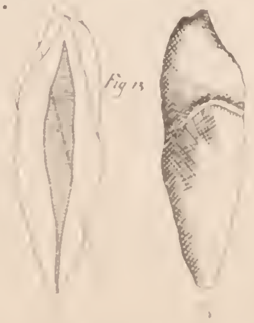


Fig. 9.—Upper left central incisor. A, distal surface; B, mesial surface ground to show canal. Dotted line shows usual lingual pit entrance and direction (rather short root).

Fig. 10.—Upper right cuspid. A, mesial surface ground; B, distal surface. Dotted line shows direction continued from usual point of entrance.

Fig. 11.—Upper left first bicuspid. A, distal surface ground; B, mesial surface.





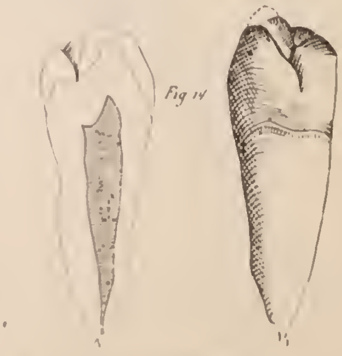


Fig. 12.—Lower right lateral incisor. A, distal surface ground; B, mesial surface.

Fig. 13.—Lower left bicuspid. A, mesial surface ground to show canals. Dotted line shows general direction of bur.

Fig. 14.—Lower right second bicuspid. A, distal surface ground; B, mesial surface.

Fig. 9.—Note in this drawing the close proximity of the pulp to the incisal edge—a condition existing in more cases than is generally supposed.

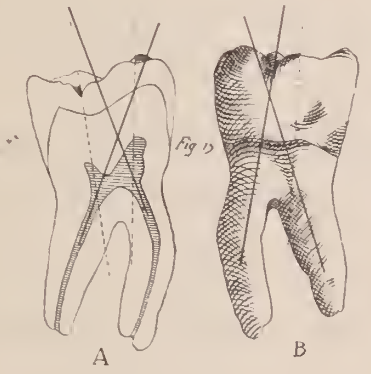
Fig. 10.—This upper cuspid might be called an ideal type. It gives little trouble to the operator and there is not as much extension of the pulp into the crown as in some other types.

Fig. 11.—As the occlusal plane of this bicuspid tooth faces outward, the longer buccal cusp gives the impression that the tooth is vertical and the buccal root parallel with the median line of the body. Here again we might use the term, *compensating buccal cusp.*

Fig. 12.—The same can be said of the lower incisors as has been said of the uppers--compare.

Fig. 13.—This lower cuspid is a common type; as a rule, it is fairly vertical in the arch.

Fig. 14.—Another ideal type. These usually give little or no trouble to the operator, except that when the inclination of the crown is well inward a good direct view of the opening cannot be had except at the expense of the buccal cusp.



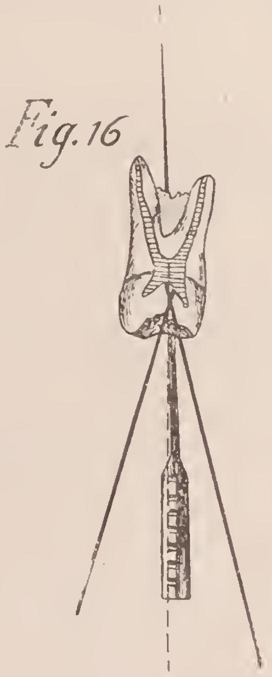


Fig. 15.—Lower right molar. A, buccal surface ground to show canals; B, lingual surface.

Fig. 16.—From Cryer: "Internal Anatomy of the Face." Fig. 28.--Tooth which has been drilled through while in the mouth. Lines have been added.

"Fig. 28 is an illustration of a tooth which has been perforated by a drill while in the mouth, the operator supposing his drill was passing up the palatal root, instead of which it passed through the pulp-chamber, the base of the crown, the alveolar process, and into the maxillary sinus."—Cryer, page 39.

Fig. 15.—This is a common type of lower molar. Note the mesial canal. Its entrance is under the apex of the mesial cusps, but its *direction* is on a line drawn from the distal cusps to a point about between the upper third or the middle of the mesial surface of the mesial root.

Fig. 16.—This is taken from Cryer's text. It serves to illustrate what has been said and points out a common result of following *apparent* conditions, not *actual* ones.

Thus we have shown that the occlusal and incisal planes of the teeth vary as to the teeth and their position in the arch—there being three distinct planes but blending into one another—the plane of the incisors and cuspids (or anteriors), the bicuspids, and the molars. The occlusal planes of the upper teeth face outward and those of the lower face inward to meet them.

That *apparently,* as we look into the mouth, the teeth lie parallel with the median line of the body, and the occlusal planes at right angles to it. *Actually* the roots are perpendicular, in a general way, to the occlusal planes of the teeth, and the *direction of the root canals* is generally as a line drawn from certain points on the occlusal surface (or plane) to a point represented by a cross section of the root midway between the cervix and the apex. See Fig. 1.

That a line contained from the point of entrance on the occlusal or incisal surface to the opening of the pulp canal, as we look into the mouth, will not continue in the *direction* of the canal.

# GOLD INLAY, USING ALEXANDER'S PLASTIC GOLD*

BY G. E. STEVENSON, D.D.S., LIBERTY, IND.

Prepare the cavity in the usual manner for inlay, so model will draw freely. A sufficient quantity of the gold is moulded with the fingers, after slightly warming, to form a cone-shaped mass; it is then inserted into the cavity, condensed with amalgam burnishers, contoured, noting articulation, etc., the same as when using inlay wax, leaving no overhanging edges at margins; then, with a suitable pointed instrument, draw the model. Weigh the model in jewelers' scales, then invest in small amount of White's No. 4 investment compound, so that a small portion of the inlay is exposed, forming a crater-like opening. Place a ring of wire in investment for convenience in handling and dry out investment. Weigh out exactly twice the weight of the gold inlay, of 22k gold solder, flux with borax, cut pieces of solder to about fit the exposed gold in the investment and place them one on top of the other. Place investment on a suitable heating frame, cover with iron ring and screen, or place in muffle of Jenkins porcelain furnace and apply heat carefully from below. The binder of the gold in model soon burns out, leaving a honeycomb mass, which quickly absorbs the solder when heated to the fusing point. Pickle the inlay in an acid bath to remove borax scale, and finish with stones and disks as usual.

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*Clinic at Indiana State Dental Society, 1912.

**With malice toward none, with charity for all, with firmness in the right, as God gives us to see the right, let us strive to finish the work we have begun.**

# REMOVABLE BRIDGEWORK AND ITS RELATION TO FIXED BRIDGEWORK.*

BY S. MARSHALL WEAVER, D.D.S., CLEVELAND, OHIO

WHEN asked to write a paper on removable bridgework, the first question coming to my mind was: Am I in favor of removable bridgework? If so, how much?

In taking up this question, we immediately encounter the two extremists: One advocating removable bridgework for every case, the other having no use for it at all.

As in most all branches of dentistry, the man who studies the case in hand and comes to a decision by carefully weighing all sides of the question, will be the best example to follow, and, this will be the line of thought I will try to give you this afternoon.

I shall endeavor, in a brief manner, to call your attention to the merits and demerits of both fixed and removable bridgework and to point out a few of the factors which make the success or failure of the work.

Since bridgework first became a recognized factor in the practice of dentistry, one of the greatest objections to the employment of this form of denture has been its irremovable character and the inability to properly cleanse.

Bridges are made and put together in such a manner that it is impossible to thoroughly cleanse them, consequently the mouth becomes so foul as to be almost unbearable.

The odor coming from the mouth containing improperly constructed bridges, even when they receive the best of care, is peculiar to this kind of work.

Many of these conditions are not the fault of the dentist, but the carelessness of the patient.

There are many parts which cannot be reached by the brush and afford places for lodgment of food which becomes decomposed.

This decomposition of food-stuff, the resulting foulness of the mouth and the disagreeable odor arising from such conditions, are perhaps not the worst features of cases of this kind.

The general health of the patient may be greatly affected by the serious pathological conditions arising from the illfitted and uncleansed bridges.

When the local disturbances are not taken care of, they result in the loss of the abutments and many times cause the loss of adjacent teeth.

The most common sight is to see hypertrophied conditions around the abutments exuding pus in large quantities.

These are the conditions, gentlemen, that cause many of our older and best operators to condemn bridgework, and rightly they may, for these are the conditions leading some of the younger men to try to solve the solution in a more thorough manner.

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*Read before the Central Ohio Dental Society.

One trouble is, there is less time given to this class of work in our colleges than most any other branch.

In a great many cases the prosthetic work may have been done admirably, but little or no attention is given to that part of the work on which success or failure of bridgework entirely depends, which is the position, condition and preparation of the abutments which are to serve as supports for the bridgework.

We read a great deal about different styles of abutments, ways of making cusps and various other technicalities, but very little about the preparation of a perfect abutment, the foundation upon which success or failure must stand.

It is my intention to only touch upon this all important work, for I was requested to deal more with the prosthetic side.

I have only touched upon a few of the objections of fixed bridgework and particularly the ones that may be overcome by removable bridgework.

With the advent of removable bridgework, the possibilities of bridgework have been greatly increased.

Many cases where fixed bridgework would not be advisable and a plate would have to be advised, the removable bridge comes in to fill the great want.

For example: extension saddles, such as exhibit A, this case positively could not be made fixed and give satisfaction.

In this half-way stage between bridges and plates, the removable bridge or bridge-plate has its greatest usefulness.

Aside from the increased possibilities which removable work presents, one of the most important to be considered is the hygienic standpoint. Another great point is the ease with which it can be repaired in case of accident.

A loosened abutment can be re-cemented without any inconvenience and little expense to the patient.

A condition that makes you say "Damn" is when a shell crown loosens on one end of a fixed bridge with a porcelain dowel crown on the other.

In filling an adjoining tooth to a removable bridge, the rubber dam can be adjusted and the work accomplished with perfect ease; not so with the fixed bridge.

One of the most valuable points in removable bridgework is the possibility to follow up any absorption by adding to the saddle either with gold or vulcanite; also any point of irritation can be adjusted perfectly.

The value of removable bridgework depends entirely upon the accuracy with which the work is done; there is an exactness that must be carried out or the piece is worthless.

A well-made fixed bridge is much to be preferred to a poorly-made removable one and would give much better satisfaction.

We also have the fixed-removable work which fills another important field, that of taking care of loose abutments more satisfactorily than any other method yet devised.

This is accomplished in many ways, all depending on the ingenuity and skill of the operator and the demands of the case.

The principle consists in having a permanent coping cemented on each abutment, and, the bridge proper fitting over these, attached by means of iridio-platinum screws, tapered lock pins, self-locking hinge joints or most anything that your imagination can devise, so the operator can remove the work at his pleasure in case of accident or trouble with any of the abutments.

This is especially adaptable in mouths where pyorrhea exists. These abutments are nearly always loose and move up and down in the sockets, and by experience you know how hard it is to place a fixed bridge on these cases and get good results, but with appliances such as screws to draw each abutment down into the bridge abutment receptacle and hold them firm and in perfect position, the root trouble is greatly lessened, also the bridge can be removed and the roots scaled at the option of the operator, which is a great advantage and adds greatly to the life of the teeth.

I will now take up the technique of the most essential devices used in the different classes of removable bridgework.

We will first take up the telescope crown, the foundation of all removable bridgework.

In the construction of the style of attachment which involves a gold telescope crown and split post, the tooth is devitalized and prepared as for a full gold crown, the occlusal surface being cut off enough to allow a good thick cusp.

A band is then made of 28-gauge coin gold, "by the hickory stick method," so its sides are parallel or slightly larger at the *cervical end;* this is accomplished by cutting the band on a slant (Fig. 1).

Fit the band to the abutment, properly festooning it, having the band pass just under the free margin of the gum. Now mark around the inside of the band level with the top of the abutment, remove and cut to line and file flat, sweat on a floor of 28-gauge coin gold, dress off flush with band and polish with pumice, then with twist drill of proper size to admit the tubing, drill a hole of sufficient depth into the tooth to give the required grip on the abutment, at the same time having it parallel other abutments.

Place the gold cap on the abutment and pass the drill through the floor opposite the one previously drilled in the tooth, insert tubing to bottom of hole and allow it to protrude through floor sufficiently to ensure its proper alignment in the impression (Fig. 2).

Now take an impression with Metalline or plaster, remove and run with Imperial investment, or any other good soldering investment.

When hard, solder with 22k solder, throw in water and cleanse in acid.

Make a funnel of paper or of wax an inch or two long, fitted tightly around band and fill with low fusible metal. Fig. 3 (a) Rubber tubing is also convenient.

An outer band of coin gold is made a little smaller and driven on over the reinforced inner cap to within about 1-32 inch, or just above the gum line. Fig. 3 (b.)

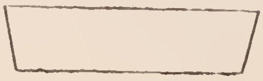

Fig. 1

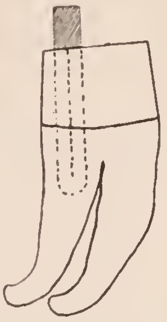

Fig. 2

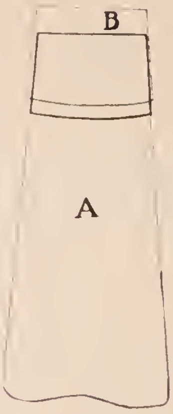

Fig. 3

Now cut off and file flush with the inner cap and sweat on a floor; next puncture through the floor into the tube and cut to proper size to admit the split pin; fit pin in tube, allowing it to protrude ⅛ inch or more, press on some metalline and cool.

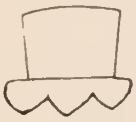

Fig. 4

Fig. 5

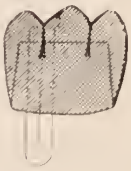

Fig. 6

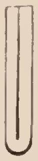

Fig. 7

Remove and pour investment in crown around pin. Work some stop-out material into crack of post to prevent solder from flowing before impression is taken.

When pin is soldered thoroughly, cut it off 1-32 inch above floor, so when cusp is soldered on it will have a good grip on the pin.

Remove shell from fusible metal by boiling in water, cleanse in acid and place both in position on tooth, place wax on top of telescope and form cusp, allowing it to extend over the sides as far as contour is required (Fig. 4).

Remove and cast. When cast, place in position and solder with 22k solder, contouring from cusp to cervical edge with solder.

The contouring can also be put on by the wing method (Fig. 5).

When the telescope is in place, it presents the appearance of a perfectly contoured crown (Fig. 6).

The split-posts are made by bending half-round iridio-platinum wire on itself and caught with a small particle of pure gold, then file or turn to fit the size tube required (Fig. 7).

This attachment can be varied to suit any or most all cases.

We will now take up the *removable* attachment. The teeth are cut off 1-16 inch above the gum and fitted with copings similar to a Richmond crown.

Put as heavy a pin into the root as it will stand, and thoroughly roughened, having it pass through the floor and soldered securely.

Take a piece of iridio-platinum wire ⅛ inch square and drill a 1-16 inch hole through the center lengthwise, cut off ⅛ inch in length or more, if the case will admit, solder this to the lingual occlusal side of the coping, if you are going to use a porcelain facing, and if not, the nearer the center of the coping the more strength is acquired.

To prevent solder from flowing up on the inside, fill it full of stop-out material.

When soldered securely, file to the shape of a truncated pyramid. At this stage you will have a coping resembling Fig. 8.

After this coping has been filled (as in Fig. 3) with fusible metal, suage a piece of 36-gauge 24k gold over the top of this coping.

It may break over the pyramid, which does no harm, burnish and swage over the edge, making a band nearly as long as the coping band, trim off, anneal and re-fit until it fits the top and sides perfectly.

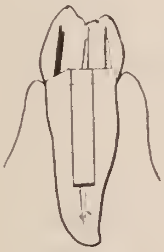

Fig. 8

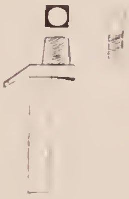

Fig. 9

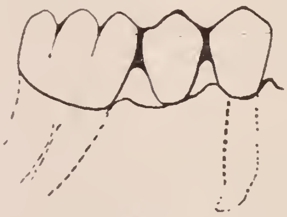

Fig. 10

Fit a graphite point into the screw hole of the pyramid large enough so it will keep the direction of the hole, and long enough so it will just protrude through the wax when the crown is completed ready for casting.

This graphite point allows the drill to follow accurately into the center of hole in pyramid, thereby running no risk in missing the center of pyramid and spoiling your piece of work.

If Steele's facings are to be used, grind to place, wax up the entire contour and cast.

After casting, place crown on coping and drill out graphite point and enlarge to the desired diameter, counter-sink the hole on the occlusal end to receive a square-shouldered screw, or tapered if desired.

The hole in crown is made slightly larger than the one in pyramid, for it is not to be threaded.

Then tap the pyramid, being careful not to spoil the thread. Make the screw of iridio-platinum wire.

When completed, you should have a cross-section resembling Fig. 9.

Remember, all the drilling and tapping, with the exception of that done on the pyramid, is done after the bridge is finished.

All this work is done on a fusible metal model.

Richmond's metal is used principally, or any metal that will melt in hot water.

One great point in all kinds of bridgework is to have the dummies attached high on the abutment, leaving a free space for the gum around each abutment.

Ninety-five per cent of the bridges coming into your office you will find the worst condition at this point generally caused by impingement of the tissue (Fig. 10).

### SUMMARY

*The Advantages of Removable Bridgework:* 1. Hygienics; 2. Restoration of Lost Tissue; 3. Esthetics.

*Some Disadvantages:* 1. Excessive Strain on Abutment if slightly Loose, caused by Frequent Removal; 2. The Necessity of the Destruction of Every Pulp; 3. Bulk; 4. Expense to Patient.

*Cases Where Removable Work is Indicated:* 1. Where Abutments are Strong and Immovable; 2. Where Large Restoration of Lost Tissue is Required; 3. When the Tissue underlying the Saddle is subject to Change; 4. Where there is Liability of Fracture; 5. Extension Bridges; 6. Unparallel Abutment.

*Cases Where Removable Work is not Indicated:* 1. Where Abutments are at all loose; 2. In Close Bites where the Bulk would be to a Disadvantage.

### THE SURGICAL TREATMENT OF CLOSE BITES

The surgical treatment of close bites is an operation that should be used a great deal more than it is. When a case presents itself where you should have a good deal more room to enable you to get enough material for proper strength and esthetics, why should we hesitate to remove enough of the ridge and tissue to ensure a good piece of work? The tissue to be removed has no function, and consequently the patient suffers no loss by such procedure.

It is generally advisable to give an anesthetic so the operation may be done thoroughly.

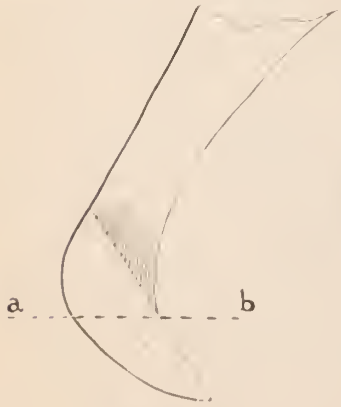

Fig. 11

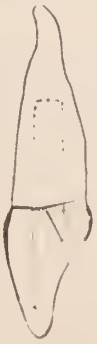

Fig. 12

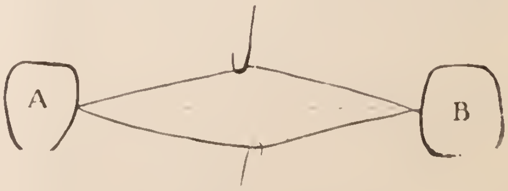

Fig. 13

The technique is very simple. First, make an incision extending from one abutment to the other, pass a sharp hook through the middle of this flap and dissect back each way; then, with a pair of alveolar forceps, pinch off the desired amount of bone tissue. Have a good hoe currette ready to smooth off the rough particles of bone and take a stitch or two as the case may demand, and in three or four weeks the case will present an alveolus made to order, and there should be no reason why the operator should complain about not having enough room to make a nice piece of work.

# PRESIDENT'S ADDRESS*

### BY DR. M. H. DAILEY, PARIS, KENTUCKY.

AT THE LAST annual meeting of the Kentucky State Dental Association, held in the charming little city of Owensboro, you made me president, and it is with sincere pleasure that I express to you my profound appreciation of the honor you have conferred upon me. In assuming this important office, I was deeply sensible of its vast responsibilities as well as its honor, and it is my conscientious desire to discharge its duties fearlessly, faithfully and impartially.

It is now my pleasure to greet you, members and visitors, and to extend to you a hearty welcome to the forty-third annual meeting of the Kentucky State Dental Association. We are assembled here for a great purpose, to do great work and to carry out the honest desire of each and every one of us, namely, to lend a helping hand to the successful development of our profession. We are sure that we shall find it enjoyable, interesting, and profitable to the fullest extent. It is an opportunity to hear the many good papers that will be read, to see and enjoy the clinics and exhibits, and to become better acquainted with each other. Here we may shake hands with our brother practitioners, and thus draw closer together in a fraternal fellowship that will unite our hearts and minds in lasting good to our profession.

It is a source of great pleasure to us to meet in this beautiful city, charmingly situated here on the banks and at the falls of the great Ohio: the most progressive city of our good old commonwealth, Louisville, noted for its beautiful homes, beautiful women, intelligent and enterprising men.

It is always a pleasure and gratification to note the excellent calibre and unquestioned merit of our members residing in this city—men ever ready to strive and fight for a higher ideal and a more progressive standard of dentistry.

We desire at this time to thank the officers and members of the various committees for their faithful assistance during the year that is past. Especially do we extend from the chair, as president, both personally and for the Society, sincere thanks to the executive committee for their wise and efficient labor. That they have performed their duty well is evidenced by our splendid program.

It is the desire of your president that this program be carried out promptly, and that due respect and close attention be accorded both to the clinics and essays. We believe that very frequently at these meetings this is not done. A general lack of interest results, and usually manifests itself in the non-participation in the discussions which follow. It is no uncommon sight to see members engaged in conversation during the reading of a paper, and if they do not leave the room before it is finished, as soon as the clapping of hands and tramping of feet subsides, the doors are crowded with men trying to get out. This is very discourteous and discouraging to the essayist, for it is no easy task to get up a paper. Its preparation usually means a sacrifice of time, and frequently money, and we feel that some appreciation, at any rate consideration, should be shown him who is trying to give us what benefit he can by offering his mite of information in the treasury of dentistry, that the work of improvement may be carried forward.

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*Read before the Kentucky State Dental Society, 1912.

We are assembled here not merely for pleasure, neither to see nor to be seen, but to combine business, thought and action, and to give our support to the betterment and uplift of our profession. Each year sees it broadening and improving. In the present status of our profession we have reasons to be justly proud, some things to regret, and many things to hope for. We have certainly made great and wonderful strides in intelligence, in specific knowledge, in appliances, in Orthodontia and Dental Phrophylaxis. The profession of law has made little progress in a hundred and fifty years; preachers are no better than they were a century ago, and have physicians made advancement commensurate with the progress of the age?

Dentistry, as a profession, is still young. Within the past fifty years its stately steps and notable achievements have given us respectability everywhere. We take laudable pride in engaging in it, for we find it now ready to lock arms with the aristocracy of all professions.

It is said that dead men tell no tales, and so the physician has a decided advantage over the dentist. But without even the slightest reflection on the skill and wisdom of the physician or surgeon, we, as dentists, must not show incompetency, for our patients live to abuse and curse us. Our poor work grins and shines at us from their mouths, and makes for us illuminating signs, advertising us most successfully, or rather unsuccessfully.

It would not be boasting, when we consider our age, to declare that no profession stands higher to-day in science, skill and art than Dentistry. The necessity for high-grade work is apparent. It must not only be durable and substantial, but artistically formed, beautifully finished, and possessing every point of skill and excellence. The whole profession is reaching upward towards higher attainment. We are fast clearing away the shrubbery, setting out beautiful trees, and improving our surroundings. The public appreciates our efforts, and is welcoming us as co-workers. We are regarded not only as a skilled profession, but as an able body of social benefactors, spending our lives in curing and preventing the ills to which humanity is heir. So we have many things to be thankful for, and not a great deal to regret, but there are still some serious conditions existing among us which we in the society greatly deplore.

How very distressing when we realize what a small percentage of the registered dentists in Kentucky are members of the State Association. It seems very plain that something is wrong; that something can be done, and that something must be done to increase our membership is apparent.

We do not know where to lay the blame for this state of affairs, but we do know that there are many good men throughout the state who should belong to the society, and who, if awakened to a proper interest in their profession, would help to raise the standard of dentistry in Kentucky. We need an awakening, and it must be done through the state society. It cannot be done, however, with our members asleep or indifferent, and making all kinds of flimsy excuses for not attending the meetings and helping in the upbuilding of our society.

I have heard it from someone that the state society is only a humbug, or that it is just a chance for Dr. So and So to talk and be seen. May the good Lord have pity on such ignorant, selfish cranks that live for themselves, shut up in their own surroundings, and happy in the belief that they know more than anybody else in the profession. They sleep and are dead save to the few faithful that stick to them from year to year. These they manage to impress as having a great knowledge of dentistry, and how great a waste of time it is to attend the state meetings. On the contrary, if they were not so ignorant and narrow, they might have the advantage of seeing a demonstration of something new as it comes out, instead of saying that the society is no good, that there is nothing in the inlay business, nothing in the silicates, nothing in porcelain, etc.

In some sections of Kentucky, dentistry today is on a basis with the commodities. People go from one office to another getting prices, and then the scale of prices is so low that the poor, struggling practitioner barely manages to feed and clothe his family, instead of making the reasonable profit that he should, enabling him to better support and educate them and have a little left over to pay his way to the state meetings. With the price of dental supplies in the hands of trust and combine, how can a dentist live, making gold crowns for $3.50 each, amalgam fillings for 50 cents and gold fillings for $1 to $1.50, with a guarantee to last ten or fifteen years?

This is the condition in many localities throughout this state. Many of these men throughout the state are wrong and don't know it. They need an education; an awakening, so that when the bell rings for the meeting to begin, we might see train loads of dentists coming from all corners of the state, their hearts filled with energy and desire to raise the standard of our profession. Is it not alarming that with 750 registered dentists in the state, less than 350 are bona fide members of our association, and usually less than half of these attend its meetings?

We can change the situation if we will bring it properly before our members in the society and likewise our fellow practitioners on the outside. We can educate them in their duty to their practitioners on the outside. We can educate them in their duty to their profession, and what it means to actively engage in its upbuilding. This situation has grieved us no little, and because of it we have given it considerable thought.

We believe that our meeting is held at the wrong season of the year to insure a good attendance. It is usually so hot that many of the members prefer going to some summer resort, and it is hard to arouse an interest in those present on account of the heat. They hang on the outside trying to keep cool, and leave the meeting without knowing what has taken place. If our time of meeting could be in January, or some other month when the weather is bad and cold, we believe the attendance would be larger and the interest greater while the meeting is in progress. The dentists out through the rural districts are really less busy in the winter than in summer, and we believe they would be more likely to come in the winter season. This is merely a suggestion that we would like for the society to take under consideration, and give some expression upon, before the close of the meeting.

For the good of the society, and looking towards the increasing of its membership and the schooling of the dentists throughout the state relative to raising the standard of our profession and securing their co-operation with us in the fight for higher ideals, I recommend that a committee of five men be appointed by the incoming president, two of this committee to be the president and secretary, whose duty it shall be to take this work in hand and see what can be done in this state for our society and profession.

As a suggestion along this line, we have thought that if finances could be so arranged, a good man might be selected to visit all the dentists in Kentucky, in the country as well as in the cities, and lay before them the great need of an awakening and just what our society stands for. On the other hand, it might be possible to establish a Kentucky State Dental Journal, with one or two issues each year, publishing what the society has done, is doing, and hopes to do, together with editorials describing the conditions throughout the state, and appealing to every dentist within its bounds for his sympathy and co-operation in the work.

While we highly esteem and approve all good legislation, we believe that the schooling previously outlined would redound to far greater good than all the laws we could possibly get in the statute books of Kentucky.

We have now one of the best dental laws, if not the best, in the United States, and we but poorly express our appreciation when we congratulate most heartily the legislative committee that framed the bill and secured its passage at the last general assembly of Kentucky. The good results of this law we believe and hope will pile up and become a lasting monument that will commemorate their hard and earnest labors, and thus compensate them for the unselfish giving of themselves and their time for the good of us all and those who shall follow after us. In fact, we all should feel rather chesty, and shake hands with ourselves—especially those of us who contributed either money or good will to the securing of this bill. Especial praise is due Drs. Meguiar and Rose, who gave so much time from their practice and did more than all others to bring about the victory that means so much to dentistry in Kentucky. We believe that the deception through illuminated signs that have been blazing all these years from the windows of the advertisers will soon die out, and that new light, life and higher standards will spring up in the hearts of every dentist throughout this good old state.

If we succeed in reaching the highest degree of excellence in our profession, if we uphold the fundamental principles for which our society stands, we must have such laws, and stand as a unit for anything and everything that will advance our cause.

But there is yet more legislation badly needed. The cry for oral hygiene to be taught in the public schools has been insistently ringing for some time. The public is calling for it, and wherever there has been any medical inspection of the school children, the physicians are also asking for help from the dental profession. It is not my desire to tire you with statistics, but let me give you just a few figures that will give you an idea of the actual conditions existing in the schools of America.

Out of 500 average school children recently examined by the Board of Health physicians in New York, 400 had some facial mal-formation which, taken in time, was remedied by simple treatment. Dr. C. Ward Crampton, director of physical training in the Board of Education, New York, who looks after the health of over 700,000 boys and girls in the public schools, says: "If New York school children are typical of school children in the United States, there must be in the schools of the country 12,000,000 children having physical defects, more or less serious, that should receive attention from parents and physicians; there must be 8,988,000 handicapped by bad teeth. Besides these, there are some 7,092,000 suffering from defective breathing, 5,460,000 having enlarged glands, and 1,248,000 suffering from mal nutrition as a result of bad teeth. Of these, there are 41,600 in New York alone."

Is this not an appalling state of affairs, and yet not so surprising, either, when we know that it is estimated that only 8 per cent. of the people in this country take care of their teeth?

Dr. Osler said recently that sound teeth were of greater importance to the nation than the restriction of the consumption of alcohol, important as that latter problem is. And Dr. Wm. R. Woodbury, neurologist to the Boston Dispensary, says that a neglected mouth is a hot-bed for infectious diseases; that it furnishes a fertile soil for infectious germs, that is favors diphtheria, scarlet fever and measles. Even rheumatism, one of the most intractable of all diseases with which physicians have to deal, according to Dr. Gordon Wilson, a prominent physician of Baltimore, arises most often from a source of infection found in the teeth. In the light of these facts, is it not our duty to bend all our energies towards this great reform, and give our knowledge and skill towards the alleviation and prevention of so much affliction and disease?

We must respond to the call, and not rest until we have a law compelling the instruction of oral hygiene in every public school in the state. We believe the legislative committee should take up this work now, notwithstanding the fact that it is two years before the next meeting of the general assembly. This would give the committee ample time to plan such a law and keep it agitated.

There is still another most important bill we should like to see passed at the same time, and a committee appointed to look after its interest. We have for several years thought it criminal neglect that the poor unfortunates in the state penitentiaries and insane asylums were without the care of a dentist. We find in the three penal institutes of Kentucky the following number of inmates: In the penitentiary at Frankfort, 1,430; in the Eddyville penitentiary, 825; in the House of Reform at Greendale, 650, making a total of 2,905 prisoners without any state provision for dental care and oversight. Again, we find in the three asylums for the insane in Kentucky 3,670 patients, who have no such care. In Lexington, the Eastern Kentucky Asylum has 1,088; at Lakeland the Central Kentucky Asylum, 1,430; at Hopkinsville, the Western Kentucky Asylum, 1,152. Is it not time that we extend a helping hand to these poor unfortunates who have enough suffering to bear without the addition of aching teeth? It is an opportunity for us to do an everlasting good by obtaining legislation that will secure dental services in the various institutions for the insane. The State of Kentucky spends thousands of dollars to relieve the physical suffering of these unfortunate beings, which suffering is frequently the cause of their mental aberration. This being true, should not a dentist be regularly employed in each institution?

We wrote a letter seeking information along this line during the last general assembly, and just about that time a bill was introduced suggesting that a dentist be placed in each of the asylums. We made an effort to find out from what source this bill originated, but could get no information until it was too late to do anything to help it along. As there was no especial push behind it, it died, and the poor insane are still suffering for dental care.

If we are true and stand by the fundamental teachings of our society, then it is our duty to enlighten the public mind as to the great need of dental care to relieve the suffering of all inmates of charitable institutions in the state, and how important to prevent disease of suffering among children in the schools. Such work on our part can result only in untold relief for afflicted humanity and crown us as victors and benefactors doing a great and noble work.

The dental profession would be unlimited in its power for good, both to itself and to the people, if it would stand as a unit against all the evils that confront us. The dental trust that has had our hands tied and been a burden to all dentists all these years could be broken, and some of the money we pay out to millionaires could be enjoyed by the public as well as the individual practitioner.

We hope, before the green doors of mother earth close over us and we are no longer a part of the great and noble profession, to see Congress take such steps that S. S. White & Co. and all the trusts with which we are oppressed will be destroyed and scattered as the chaff before the wind.

We believe that if all the societies would get busy, organize and interest our congressmen, that the curtain could be raised, and when that wise body of law-makers could see the picture in its true light, our hands would be loosened, the trust chains broken, and they would have power to bind us no more.

Again we thank you for the honor of having been made president, and before we say farewell, we want to call your attention to the fact that many years lie ahead of us and that a great deal of work is yet to be accomplished. Since this is true, then let us so work and live and strive that those who shall come after us may hold us in such esteem as we have for those who have gone before and made ours such a noble and glorious profession.

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## LET THE CHILDREN LEARN SELF-RELIANCE

Alas! how often the mother's sacrifice is a double robbery! She robs herself and she robs her children.

But how?

The first obligation on every soul born into the world is to make the most of itself.

When a mother devotes herself to her children to the exclusion of all other interests, neglecting friendships and entertainments and outings and all opportunities of growth—she is robbing herself.

When she so devotes herself to her children, she is likewise robbing them. For by the constant care she teaches them to rely on her rather than on themselves.

She robs them of their self-reliance, without which boy or girl is a rudderless craft, bound for the bottom of the sea of life.

The biggest thing parents can do for children is to make them paddle their own canoe—make them pull their own weight from the first moment of conscious thought.

As soon as a child knows how to think he becomes an individual, with rights and obligations.

"Such a little fellow!"

But if he is to be a big fellow out there in the big world, pulling a big stroke, mother must begin with the little fellow.

That's so.

Love can do such strange and strangely opposite things.

Mother-love grows strong men and women. Also mother-love grows weak men and women. The difference lies in the way the love is manifested.—Erman J. Ridgway.

# SOME CHANGES THAT HAVE BEEN MADE IN DENTAL AMALGAMS AND THE ATTITUDE OF THE PROFESSION TOWARD THEM*

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IN THESE DAYS, when the inlay method of filling teeth is so prevalent and the profession is so prone to consider some of the newer materials, the most prominent of which is the silicate cements, with more or less favor, you might on casual observation wonder at the venturesomeness of one attempting to revive interest in that old, old subject, amalgam. But! The committee that solicited this essay assured me that you were to have several things at your meeting that would awaken some of your profession to a better understanding of the use of amalgam, and this with knowledge of the fact that it has gradually become recognized that amalgam alone, and the amalgam inlay, constitute dental services of the highest order when judiciously applied, made it a pleasure for me to accept. We have had periods in the history of the dental profession when it would seem that men capable of exercising sound judgment in selecting materials with which to repair the damage done by caries have failed to do so, and before they realized it have been carried away by one of these periodic fads and have found themselves discarding some of the time-tested materials, the most common of which was amalgam. In the days of J. Foster Flagg there were no such fads as we have now, though the history of amalgam shows that there was not at that time freedom of scientific thought and investigation on the subject. Neither does the history of the material show that at any time subsequent to the days of Flagg has there been a tendency on the part of most of the profession to discuss the subject as freely as it has some others.

While we have had some in the profession who would grasp one of the new materials heralded as a panacea for all dental ills, and discard some of the materials known to be capable of giving good service, and a great many who seem not to care to discuss or have much to do with amalgam, there have been a few who, like Flagg, recognized some of the inherent qualities of the material and have not only given it some study and a place in their practices, but have shown no desire to refrain from letting others know it. This is what we must do if we are to use amalgam intelligently: we must study it: we must believe in it, not necessarily to a great extent, but we must actually regard it as the best material that we can use for certain cases, leaving out of consideration the abuses to which the material is put by some. Such was the attitude of Flagg. He believed its use constituted services of the highest order.

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*Read before the Kentucky State Dental Society, 1912.

but he did not think that it was indicated everywhere. In his introductory to his last work on plastics he had this to say to the profession that had viewed askance for over fifty years anyone who dared to say that they regarded the use of amalgam as high-class services; he said: "Before entering upon considerations pertaining to the historic, analytic, utilizing and manipulative detail of our subject, I feel desirous that the thoughts of my readers should be so directed as that there shall be, at once, a recognition of the great fundamental differences in basal principles and practice which exist between the Schools of Gold and Plastic Dentistry. As facts in relation to present methods and results are accumulating, I am the more impressed with the growing need for the uprooting of that tendency in dental teachings and practice which has, thus far, resulted in such waste of time, energy, strength, money, and teeth, and which still, in some sort, holds sway at the gatherings of the "wise men." The idea of pounding piece after piece of gold into some inaccessible pocket, far below the gum, in an annex to a cavity almost into the pulp, on the distal face of a lower molar of poor structure, and calling it "the highest attainment of first-class dentistry" is, to me, something incomprehensible! It is but trifling with the dignity, the broad ability, the glorious possibility of our profession. Nor is it an overdrawn picture; it is precisely what is yet done—done "by and with the advice of and consent of the Senate," and it is truly an imposition upon patients and upon the younger dentists, inflicted in the name of science and of art. The depth and breadth of the work to which I have been called impressed me most earnestly as I view more and more clearly the vast differences between "Gold-work," regarding that as one school of dentistry, and "Plastics," regarding that as another school of dentistry. Outwardly, the two schools are very different even to the most casual observer, but in proportion as one is educated in both, this external difference becomes even more tangibly apparent; the materials are different; the appliances are different; the methods are different; the instruments are different; the attempts are different; the possibilities are different; and the results are different." After several more paragraphs of even more pointed discussion regarding the general attitude of the profession, and particularly that of the American Society of Dental Surgeons, Dr. Flagg asked two questions and answered both. The first was "What is the first thought of the gold worker?" And his answer was "How shall I get a good, solid gold filling into this cavity?" The second was "What is the first thought of the worker in plastics?" And the answer was "What is it best that I should fill this cavity with?" While Flagg was admittedly a champion of the cause of amalgam, it is obvious that he was not advocating its use indiscriminately. Neither was he attempting to lead anyone to believe that the gold filling was not superior to amalgam in many cases. He was making a vigorous plea for the careful selection of materials for the different cases that presented themselves, and the elimination of the idea that any one material could be applied to the exclusion of all others and have the result appear as the highest class of dental services when all phases of the problem were considered. The objections to amalgam at that time were not based upon a knowledge of its undesirable properties, nor were the claims for it made in regard to its definite physical and chemical properties which fitted it for application as a restorative and therapeutic agent for the relief of clearly defined physical and pathological states. They were made almost entirely upon prejudice engendered by the manner of its introduction some fifty years before and the fact that it contained mercury, a substance known to induce ptyalism under certain conditions. Yet Flagg recognized in the then crude material a few qualities which would make a field for it in dentistry. I am sure none of you would be long in forming an opinion of an attorney who attempted to apply one principle of law to every case that was presented to him. Nor of a physician who failed to distinguish between the characteristics of certain drugs which made their application possible in certain cases and prohibited in others.

But! I am curious to know how many of you appreciate the real value to a growing profession of a man who will act as the ''governor of the engine,'' as Flagg did by pleading for the adoption of everything that had any good qualities and the execution of keen judgment in keeping it where it belonged. He had only gold and amalgam to plead for at that time, but later had added to the list gutta-percha and the different cements. With the baked and cast porcelain inlay, gold inlay, silicate cements new forms of gold, tin, alloy, etc., before us, each of which has some quality which makes it more desirable than others, consequently its application more desirable in some places than others, does not the stand which Flagg took appear a monument around which more of us should gather?

We must admit that the introduction of several new filling materials has limited to a great extent the use of amalgam, a thing which every man with high ideals should be proud of, but who is there among us that would regard his services complete and of the highest order without a little to use once in a while? With this importance placed upon amalgam, I want to call your attention to some changes that have been made in the material and the attitude of the profession toward one or two of the more important ones.

The first dental amalgam was one of three metals and was known as silver paste, presumably because of the comparatively high percentage of silver in the filings which were later known to be made from coin silver (silver 9 parts, copper 1 part). These filings made from coin silver were mixed with sufficient mercury to make a plastic mass that would remain semi-solid sufficiently long to enable it to be inserted, after which it slowly hardened. Little attention had been paid at this time to any of the qualities of this combination, but soon after its use became quite general the question of color of the amalgam and color of the tooth tissue adjacent to the amalgam became topics for discussion by about every dentist in the land. The fact that it contained mercury added material for a more vigorous opposition to its use. The attitude of the profession toward the material is well represented in a paragraph from its history by Henry H. Burchard, in which he said: "Applied upon a basis of glaring empiricism, with an absence of technical skill, the material received the prompt and sustained condemnation which its abuse had warranted. The steps and phases of this opposition of the trained and skilled against untrained and unskilled operators may be read in the dental journals of from 1846 to 1878 and even after. It was commonly known as the "amalgam war." It is not strange that such an inferior material as coin amalgam should be condemned by the skilled gold workers of that day, but the point of significance is that none seemed to recognize any good in the material, and not only avoided giving it a trial, but hastily pronounced its use by others as malpractice. So bitter was the feeling against the use of amalgam during the first few years of its introduction that in the early forties a committee from the American Society of Dental Surgeons was appointed to investigate all filling materials which had mercury as a constituent. This committee reported "that the use of all such material was injurious both to teeth and mouths, and that there was no tooth which could be serviceably filled that could not be filled with gold."

Some five or six years later a number of members of this society were expelled for using amalgam and refusing to sign a pledge not to use the material, and protesting against its use. Rather than to impede the progress of the material, this action seemed to stimulate more men to try it out, and during the next five or six years its merits were pointed out more and more clearly by men of such unquestioned reputations that there could be no doubt about their motives and sincerity. Among these men was Dr. Elisha Townsend, who, as Dr. Burchard said, was a practitioner of such great skill as to be safe from any imputation of lack of manipulative ability, who introduced what Dr. Flagg called the first formula for an alloy for making amalgam that ever had the least pretention to respectability. It was, approximately, silver 45 parts and tin 55 parts. Flagg said of Townsend that he introduced this formula "as the result of deliberate conclusions; as the result of long-continued, careful observations; as the result of an earnest desire to aid more than he had ever done—and that was very largely—in the preservation of teeth. That he did it because he saw daily the evidence that teeth could be saved with amalgam which he could not save with gold, that as one of the most competent, the most enthusiastic, and the most conscientious practitioners of his profession, he possessed a 'breadth of base' which permitted, nay, insisted upon, a mental recognition of merit wherever evidence of its existence could be shown." Regardless of the standing of Townsend, and regardless of the pleadings of Flagg and his followers, amalgam remained under the ban until something which possessed more desirable properties and fewer undesirable ones was presented. One of the first things that the profession began to observe about the new alloy which Townsend had introduced was its better color and the better color of the tooth tissue surrounding the amalgam. Some suggested that when this new alloy of Townsend's was purified or washed, as they called it, it was much more desirable to use from the standpoint of color. The washing consisted of placing the amalgam mass in a mortar and rubbing it with the pestle after having added a little alcohol. It was noticed that the alcohol took on a dark color, and the conclusion was that an improvement had been made in the material. Later on it was found that, while the amalgam was a little lighter at the time of insertion, it would discolor in the mouth about as quickly as though it had not been washed. Another thing which a number of the profession observed was that the new combination had lost much of what was then known as edge-strength. Flagg said of it: "A filling was made which is not nearly so tooth-preserving, and which, though it is prevented from discoloring—in limited degree—by the addition of tin, is, by this modification, caused to shrink most notably, and from which is taken, practically, all its edge-strength. The washing process, so far as being advantageous, is proven to be otherwise, and, at the present day, nearly all manufacturers of alloy for amalgam caution against it in italics or capital letters. And yet the dental profession, in the persons of its representative men, welcomed in open arms the tinned and washed amalgam, as introduced by the president of its American Society of Dental Surgeons, and fairly revelled in the seemingly inexhaustible capabilities of this purified sinner."

While there were no instruments of accuracy for determining the strength, changes in volume, or practical tests for determining the discoloration, Flagg had observed the loss in strength, and the slight improvement in the color over the previous coin amalgam, and brought to the attention of the profession the fact, which has ever since been a thorn in the flesh of the alloy maker, that *amalgam changes in volume during the setting.* Since tin had been substituted for copper, the change in volume (contraction being the only change observed at that time) was attributed to the presence of the tin. After further investigation, Flagg also observed that tin retarded the setting, facilitated amalgamation, diminished conductivity, and made the statement that it was the best flux in making alloys. He also observed that when copper or gold were substituted for tin, the shrinkage was less. He made practically the same statement regarding the use of zinc instead of so much tin, thus regarding these three metals as antagonists of shrinkage, but did not seem to have clearly in mind that amalgams might actually expand as well as contract. Later on, however, he regarded silver and gold as expanding constituents and copper as an antagonist of shrinkage. It was not long after this that he selected silver, tin, copper, zinc, and gold as the metals which possessed the most desirable properties and the fewest undesirable ones from which to make alloys for amalgams, and from his time till to-day not a single change has been made in this respect. Three or more of the metals selected by Flagg as the ones from which to make alloys for dental amalgams have been the selections of all subsequent workers. With a knowledge of nearly all the properties of the five metals selected, Flagg presented to the profession four alloys which he regarded as indicated in places where one property was of such importance that it was better to sacrifice something in other properties in order that the one under consideration be brought out to its fullest extent. For example, his Contour Alloy with

Silver, 63 parts    Tin, 33 parts    Gold, 4 parts

he claimed had excellent edge-strength, quick setting, and no shrinkage as the qualities which stood out prominently. For his Front-Tooth Alloy, with

Silver, 50 parts    Tin, 24 parts    Gold, 20 parts    Zinc, 6 parts

he claimed better color and less discolored teeth, *reasonably* quick setting, edge-strength, *sufficient* and *more pleasant working* qualities.

In regard to his Facing Alloy, with

Silver, 40 parts    Tin, 55 parts    Zinc, 5 parts

he said: "It is moderate in setting, deficient in density, wanting in edge-strength and color, easy of adaptation, and does not leak."

For his Counter Alloy with

Silver, 60 parts    Tin, 35 parts    Copper, 5 parts

he claimed remarkable tooth-conservation. Of this alloy, he said: "It discolors reasonably, and with *desirable promptness*, if exigencies demand it, but does not usually become as black as pure copper or coin amalgam, and does not impart to the tooth that greenish hue so distinctive of copper in quantity, uncontrolled." It may be seen that at this time, when a great many of the profession were reluctant to accept anything but gold as a filling material, Flagg was not only asking that amalgam be substituted for it in certain cases, but was also asking that the profession distinguish between the qualities of different kinds of amalgam, and the application of these amalgams upon the characteristics of prime importance to the case under consideration.

The quality which he had recognized and admired in Townsend and some others to countenance merit wherever they saw it, he had put to practical application in the construction of alloys for amalgams. He designed two in which their desirable color was the thing of importance for conspicuous places, another which would discolor markedly and by so doing be a better tooth-preserver than the first, and still another with greater strength and quick setting for contour work.

Though the profession was quite generally antagonistic to the idea of anything ever being substituted to any great extent for the gold filling, Flagg's work presented a picture of a man living a generation ahead of his associates, and year by year the field of plastics has grown, and the thing for us to observe from the work of Flagg aside from the technical aspect, in these days of multiplicity of plastics as well as other materials, is the stand which he took on the recognition of the merit of a material and the courage to keep it where it belonged. From the standpoint of the development of amalgam, the coin amalgam, Townsend's amalgam and these four of Flagg's amalgams represent fairly well the changes that were made in the product previous to the work of Dr. G. V. Black in 1895-1896. A great many other alloys for amalgams were made and used, but a consideration of them at this time is not necessary. The coin amalgam saved teeth, but its color was miserable; the coin dissolved slowly in mercury; it set very slowly, and it could not be packed well. The Townsend amalgam also saved teeth, but, as Black showed later, it was capable of both shrinkage and expansion, and had little strength. Flagg's amalgams all had better color than coin amalgam, and better strength and less shrinkage than Townsend's, besides having other characteristics which made their use desirable in certain locations in the mouth. It might seem to one who had not made long observations in the use of these materials that they were about all that could be expected in the way of amalgams, but the fact that Flagg presented several alloys for amalgams was a confession of his inability to produce a *single* amalgam which possessed all the desirable qualities of the four, a thing which a somewhat repentant profession was then asking for. The desirable color of this Facing and Front-Tooth amalgam was wanted. The strength and quick setting qualities of his Submarine Amalgam were likewise desired, but they were wanted in *one* product. And, with the work of subsequent investigators put to practical application, the profession is *still* wanting an amalgam that has all these qualities in *one* product. And it will always *be* wanting one. We are getting farther away each year. The tendency for it is clearly shown by the products of the manufacturers of dental cements. Instead of presenting for our consideration one product which possesses all the desirable qualities that a material of this kind should have, we find in the market a cement for fillings, another kind for retaining inlays, bands, etc., some of which are white for the porcelain inlay and some yellow or brown for the gold one; another one for temporary work, such as sealing in dressing, etc.; a black one for places where cleanliness is a greater factor than color; a silicate cement for places where color is of greatest importance, etc. Whether or not Dr. Black realized when he did his work on amalgams in 1895-96 that such would be the situation in ten or fifteen years, is not known. It would seem, however, that one thing which will be mentioned later that he discovered might have prevented his following the example of Flagg by presenting several alloys for several purposes, even though he did see the future of plastics. Possessed of exceptional mechanical ability, Dr. Black constructed a micrometer and dynamometer with micrometer attachment, that exceeded in accuracy anything previously used for testing the changes in volume, crushing resistance, and flow of amalgams. He said of the Silver-Tin amalgams with their modifications of small quantities of other metals: "This material has already a somewhat extensive literature. Indeed, the question of its properties, and its fitness as a filling material, has given rise to much discussion and a large amount of experimental research. I have not space in this paper to review this literature, however desirable such a review may be, but it has in nowise been ignored, but has been the foundation from which the present work has proceeded, and the absence of a review is purely a matter of lack of space. It has been the intention to conduct a series of experiments upon the physical properties of amalgams upon the same general lines of research as those that have been found most satisfactory and reliable in the investigation of the resistance and elasticity of the metals used for engineering purposes, as railway bridges, buildings, etc., in which endurance and weight become important factors. These plans of experimental work have been well tried in the past, and have met the approval of the most learned engineers. For this purpose it has been necessary to devise and build apparatus adapted to the small masses of materials used in making fillings. The endeavor has been to so arrange the detail of this work that others could follow it with the least difficulty for the verification of the results or correction of errors into which I may fall. In furtherance of this design, illustrations from photographs of the apparatus used will be made as complete as possible. It is not expected that I will be able to make this experimental work complete, but rather the effort will be to establish lines of procedure in the study of this important material which are more strictly in harmony with the laws of physics than those previously employed, and which may be extended and perfected by others." While Flagg had observed almost all the physical properties of amalgam, Dr. Black realized, as did many others, that much of his work was done empirically and needed just such a going-over as Dr. Black gave it. With his more accurate instruments and a desire to go over the work more in harmony with the laws of physics, and with the work of Flagg and his co-workers as a basis, Dr. Black not only placed the observations of Flagg on a better basis and made new observations, but his name in connection with the work did a great deal to remove the ill-founded antagonism toward the use of amalgam. Not only did Dr. Black examine the products then on the market, but he took up the then accepted two basal materials for alloys for amalgams (silver and tin) in proportions ranging from a low percentage of tin and a high one of silver to low ones of silver and high ones of tin. His work did not progress far before he observed that many of these combinations would not only decrease in volume or increase in volume, but would do both, first the decrease and then the increase. He also took what he regarded the most desirable proportion of silver and tin and modified it with 5 per cent of the different metals usually employed for making alloys for amalgam and found that to a great extent the same thing was true, though of course found certain proportions to give less change in volume than others. His charts show that the alloy which Townsend introduced

### EXHIBIT OF UNMODIFIED SILVER-TIN ALLOYS

| FORMULAE | | How Prepared | Per Cent of Mercury | Shrinkage | Expansion | Flow | Crushing Stress |
|---|---|---|---|---|---|---|---|
| Silver | Tin | | | | | | |
| 40 | 60 | Fresh Cut | 45.78 | 6 | 7 | 40.15 | 178 |
| 40 | 60 | Annealed | 34.14 | 9 | 3 | 44.60 | 186 |
| 45 | 55 | Fresh Cut | 49.52 | 4 | 8 | 25.46 | 186 |
| 45 | 55 | Annealed | 32.13 | 11 | 1 | 25.57 | 222 |
| 50 | 50 | Fresh Cut | 51.18 | 2 | 2 | 22.16 | 232 |
| 50 | 50 | Annealed | 37.58 | 17 | 1 | 21.03 | 245 |
| 55 | 45 | Fresh Cut | 51.62 | 2 | 2 | 19.66 | 245 |
| 55 | 45 | Annealed | 40.11 | 18 | 0 | 17.53 | 276 |
| 60 | 40 | Fresh Cut | 52.00 | 1 | 0 | 9.06 | 239 |
| 60 | 40 | Annealed | 39.80 | 17 | 0 | 14.10 | 297 |
| 65 | 35 | Fresh Cut | 52.00 | 0 | 1 | 3.67 | 290 |
| 65 | 35 | Annealed | 33.00 | 10 | 0 | 5.00 | 335 |
| 70 | 30 | Fresh Cut | 55.00 | 0 | 14 | 3.45 | 316 |
| 70 | 30 | Annealed | 40.00 | 7 | 0 | 4.67 | 375 |
| 72.5 | 27.5 | Fresh Cut | 55.00 | 0 | 42 | 3.92 | 275 |
| 72.5 | 27.5 | Annealed | 45.00 | 3 | 0 | 3.76 | 363 |
| 75 | 25 | Fresh Cut | 55.00 | 0 | 60 | 5.64 | 258 |
| 75 | 25 | Annealed | 50.00 | 0 | 6 | 5.40 | 300 |

### EXHIBIT OF MODIFIED SILVER-TIN ALLOYS.

| FORMULAE | | | How Prepared | Per Cent of Mercury | Shrinkage | Expansion | Flow | Crushing Stress |
|---|---|---|---|---|---|---|---|---|
| Modifying Metal | Silver | Tin | | | | | | |
| | 65 | 35 | Fresh Cut | 52.33 | 0 | 1 | 3.67 | 290 |
| | 65 | 35 | Annealed | 33.00 | 10 | 0 | 5.00 | 335 |
| | 66.75 | 33.25 | Fresh Cut | 51.52 | 0 | 4 | 3.35 | 329 |
| | 66.75 | 33.25 | Annealed | 33.53 | 7 | 0 | 5.06 | 380 |
| Gold 5 | 61.75 | 33.25 | Fresh Cut | 47.56 | 0 | 1 | 4.62 | 330 |
| Gold 5 | 61.75 | 33.25 | Annealed | 30.35 | 7 | 0 | 6.07 | 395 |
| Platinum 5 | 61.75 | 33.25 | Fresh Cut | 51.87 | 0 | 9 | 9.68 | 273 |
| Platinum 5 | 61.75 | 33.25 | Annealed | 37.33 | 7 | 0 | 8 20 | 352 |
| Copper 5 | 61.75 | 33.25 | Fresh Cut | 53.65 | 0 | 23 | 2.38 | 343 |
| Copper 5 | 61.75 | 33.25 | Annealed | 35.60 | 5 | 0 | 3.50 | 416 |
| Zinc 5 | 61.75 | 33.25 | Fresh Cut | 56.65 | 0 | 68 | 1.83 | 290 |
| Zinc 5 | 61.75 | 33.25 | Annealed | 40.65 | 0 | 9 | 2.07 | 345 |
| Bismuth 5 | 61.75 | 33.25 | Fresh Cut | 46.26 | 0 | 0 | 4.78 | 288 |
| Bismuth 5 | 61.75 | 33.25 | Annealed | 23.67 | 6 | 0 | 5.58 | 368 |
| Cadmium 5 | 61.75 | 33.25 | Fresh Cut | 57.57 | 0 | 100 | 6.40 | 225 |
| Cadmium 5 | 61.75 | 33.25 | Annealed | 47.25 | 0 | 5 | 3.54 | 299 |
| Lead 5 | 61.75 | 33.25 | Fresh Cut | 44.17 | 0 | 1 | 4.88 | 290 |
| Lead 5 | 61.75 | 33.25 | Annealed | 32.76 | 10 | 0 | 7.18 | 276 |
| Aluminum 5 | 61.75 | 33.25 | Fresh Cut | 65.00 | 0 | 445 | .... | ... |
| Aluminum 1 | 64.5 | 34.5 | Fresh Cut | 46.98 | 0 | 166 | 12.60 | 198 |
| Aluminum 1 | 64.5 | 34.5 | Annealed | 38.26 | 0 | 48 | 17.90 | 213 |

was possessed of a goodly amount of both increase and decrease in volume, as well as a very high percentage of flow and a low, crushing resistance. They also show that one or two of Flagg's alloys, especially his Contour alloy, with its silver 64 per cent., tin 33 per cent, gold 3 per cent., were very close to the best combination that Dr. Black made. The change in volume was comparatively small, the crushing resistance was very high, and the flow was very low. This alloy of Flagg's was indeed quite close to the best alloys of to-day in every respect but one, viz., it was not as free from decrease in volume as Flagg had supposed. That it did not meet the requirements of these products as closely as many of our present alloys do, seems to be due to the fact that Flagg did not understand the effect of annealing these products. He had observed that alloys improved in many respects with age. He had quoted Dr. J. F. Siddall as saying that fillings that had been subjected to the heat of boiling water were desirable for use immediately after being made and given this treatment. He called this treatment "Heat-Aging," and the change that was produced by allowing the alloy to stand for some time was known as "Time-Aging." But his work does not show that he knew much about the effect upon the physical properties of alloys and their amalgams of annealing the alloy after it had been cut into filings. This remained for Dr. Black to do. Dr. Black, with his instruments of greater accuracy, and his systematic way of going about things, discovered that there was something that was producing discrepancies in his work. He had found that the behavior of the different metals when alloyed with mercury was pretty well understood before he took up the work. He was satisfied that his methods of alloying these metals were not the cause of the irregularities, so he took up the suggestions of Flagg and Siddall with his usual thoroughness. He found that, as Flagg had suggested, alloys did change with time. He also found that, as Siddall had suggested, they also changed with the application of a moderate amount of heat. The question then arose, "Is time the equivalent of heat?" and it was found that it was. The nature of these alloys is such that they anneal at room temperatures, hence if they stand a few weeks in the market they have often received the same number of units that they would if they had been subjected to the temperature of boiling water for fifteen minutes, the latter being sufficient to quite properly anneal many of these alloys.

It was found that almost every physical property of the amalgams under consideration was modified to a greater or less degree by the annealing process. The effect of annealing was very marked upon the time required for many alloys to set, most of them requiring much more time after the annealing. The effect upon change in volume was so marked that its discovery came as a complete surprise. With the shrinking alloys it increased shrinkage, and with the expanding alloys it decreased expansion. Generally speaking, it was found to be a contributor to shrinkage. Previous to the discovery of the effect of annealing upon these alloys by Dr. Black, no dental amalgams were known to be, though some were supposed to be, free from shrinkage, but soon after this he made it possible to obtain these products that would not decrease in volume. Flagg supposed that tin was the cause of shrinkage, and it is, but he did not realize that the annealing was a modifier of this movement. The discovery of this characteristic, together with the fact that Dr. Black was connected with the work, seemed to place the use of amalgam on a new and higher plane than it had ever been.

Amalgams were placed in the market that were now known to be shrinkage-free, their crushing strength and flow were known to be better than ever before, their color was better than Flagg's Submarine, but not so good as his Facing Alloy, their setting qualities were very rapid, and they dissolved in mercury slowly, though not so slowly as coin amalgam. Close examination of these new products revealed that the principal difference between them and the alloys of Flagg's make was that they were free from shrinkage at all times. They were a little stronger, but, on the other hand, they worked hard and were not as good in color as Flagg's Facing Alloy. Considering the qualities of these alloys *as a whole,* they possess more desirable properties than any product of their kind ever presented. But the profession seemed to have changed from its extreme conservatism and desire to work as it did when it would not consider anything but gold fillings and disregarded the fact that these alloys possessed about as many good qualities and few undesirable ones as present knowledge of the subject would permit, and demanded by their purchases an alloy that had the color and easy working qualities of Flagg's Facing Alloy. The manufacturers, of course, have met the demand, and, since Black's work, have furnished to the profession two great classes of alloys, one of which is about as he intended it, and one to meet the demands of those who place more importance upon easy working and color than they do upon the other properties of these products. The class of alloys known to the profession as Black's alloys contain from 65 per cent. to 68 per cent. of silver, 26 per cent. to 28 per cent. of tin, 3 per cent. to 4 1-2 per cent. of copper, and 1 per cent. to 1 1-2 per cent. of zinc. The class which has resulted from his work and the demands of the profession contain from 48 per cent. to 58 per cent. of tin, 43 per cent. to 48 per cent. of silver, and 1 per cent. to 2 per cent. of zinc. The latter class, with the absence of the copper and the lower percentage of silver, make it resemble more closely the Facing and Front-Tooth alloys of Flagg. The first class is free from shrinkage. The second class is often free from shrinkage, too, but its other qualities, with the exception of color, are so objectionable that it hardly deserves to be considered at this time. The alloys known as Black's alloys, high percentage silver alloys, quick-setting alloys, the terms being synonymous, while they are the best we have, all things considered, are possessed of some characteristics that deserve a somewhat detailed consideration. When these alloys are made into fillings in the usual manner they are possessed of some change in volume. The reason for this is that it is regarded unsafe to so arrange the properties of the different constituents in such a manner that after the alloy is annealed it will give neither contraction nor expansion. But it is regarded safer to arrange them so that at the time of making the fillings there will be a slight expansion. This amount of expansion is claimed by some of the best manufacturers to be 1-20000 of an inch on a filling cylindrical in form, $\frac{1}{4}$x$\frac{1}{4}$ inches.

This implies that if a given amount of alloy, sufficient to make a filling of this size, is mixed with a given amount of mercury, the resultant change in volume is approximately the figures just given.

It further implies that this expansion of 1-20000 of an inch is final; that the amalgam is constant in volume after this slight movement has taken place. I doubt if anyone here has failed to observe that the amalgam fillings that he inserted did not look the same along the margins two or three years after their insertion that they did at the time of insertion, and yet, I doubt if it is clear in your minds just what the cause of this change is and how to combat it. The essayist called to the attention of the profession a few years ago that many alloys that were capable of expansion would *continue to expand* after their insertion in the tooth, and many of those capable of contraction would continue to contract after being inserted in the tooth; that the small amount of mixing given the alloy and mercury at the time of making the fillings was only the beginning of the combination of these materials; and that the 1-20000 of an inch expansion claimed by the makers of these products represented a portion of the total expansion, rather than the total expansion.

In other words, the combination of alloy and mercury does not stop when the dentist stops working it, and when he stops working it he has dissolved only the surfaces of the filings in the mercury; hence, if by dissolving only the surfaces of the filings in the mercury he gets 1-20000 of an inch expansion at the time of making the filling, what will the total amount of expansion be after the undissolved portions of the filings are attacked by the mercury? It certainly will be sufficient to produce the rough edges seen in all alloys of this class after they are two or three years old. You may ask, can we prevent it? And the answer will be *no,* but it can be limited by dissolving as much of the filings in the mercury as possible at the time of making the filling, anl by limiting the amount of mercury left in the filling. This change, beginning with the work of Dr. Black, from alloys that would quite generally contract to alloys that expand, seems to be not very generally understood. Neither is the controlling factor in this property of these alloys to amalgamate after being inserted in the teeth generally understood. Dr. Black in his *Operative Dentistry,* Vol. 2, page 312, states his position in regard to the matter as follows: "Experiment in watching fillings for five years shows also that one-half of one per cent. of zinc is inadmissable for the reason that the amalgam will continue to change in bulk very slowly for that time, and perhaps much longer, though this change is not large (not more than one to one-half points per year with one per cent. of zinc), it will finally destroy the usefulness of the filling. This effect is so subtle that it was not at first discovered." A little further on the same page he says: "Copper, not more than five per-cent., if alloyed with the silver before combining with the tin, so as to insure a perfect alloy, increases the strength of the amalgam without doing injury in other ways, and seems desirable. In my present view, it is the only modifying metal thus far known that is desirable." From this it seems that Dr. Black has changed his mind somewhat, and attributes the cause of this almost continual expansion to the presence of zinc. Whether or not the elimination of zinc will prevent this change from occurring, is a question worthy of considerable study. One thing seems to be true, however, it lessens the amount of the change. I am compelled, by a large number of experiments, to believe that, even with the elimination of the zinc and the accomplishment of a fairly complete solution of the filings in the mercury, there will be some expansion with expanding alloys after they are placed in the teeth Whether or not this proves true, need not concern us so much at this time as the grand lesson which may be taken from this and applied to the use of, not only amalgams, but plastics generally. We, as a profession, have changed from extreme conservatism and a desire to use a good product regardless of the energies required of the operator and patient as well, to one in which the question of ease to the patient and ease to the operator are almost always considered equally with the durability of an operation. With some these questions have become "Fads." They pursue them with irrational zeal, giving undue consideration to the permanency of their work. This, however, is not the fault of the profession generally. But the profession generally has begun to look for ways of making their operation less tedious for their patients and likewise less tedious for themselves. Along with this search has grown a desire to get materials that work easily. An alloy, cement, gold, wax, investing material, or almost any material that works easily, is generally desired. There is one thing, however, that should be kept in mind; if it is desirable that a combination filling material should not change after you are through working it, you should have the conditions under which it is to remain such as to check the union of the solid and menstruun. If an alloy combines with mercury with little or no grinding when out of the mouth, it will combine in the mouth without the grinding, though a little slower. If it requires long and vigorous grinding outside the mouth to affect the union, it will practically cease to combine in the mouth. In other words, if it is an easy thing to put together outside the mouth, it will be an easy thing to put together in the mouth. On the other hand, if it is a difficult material to make combine outside the mouth, it will be just as difficult to combine in the mouth, assuming, of course, that it is seldom that the dentist gets a complete union at the time of making the filling. Generally speaking, the harder working plastics are the most permanent when once placed.

This is the lesson represented in the change in the alloys known as Black's alloys. To-day he advocates the elimination of zinc, even though it does detract from the color and make the amalgam work harder, because he has discovered that its presence aids in the changes that occur after the filling has been placed. With one or two exceptions, the manufacturers are adhering to the former views of Dr Black in making these alloys. This presents for our consideration to-day two classes of Black's alloys, one representing his former views, and one his present views. It presents to us the question of zinc, or no zinc, in our alloys, the same condition that confronted Flagg almost half a century ago, though the question of long-continued expansion was not connected with zinc at that time. Just what the attitude of the profession will be towards this new condition cannot be told at this time. It would seem, however, that the measure that the profession uses to tell whether a filling material is good or bad has changed to such an extent that the alloys containing zinc will remain. It is possible, too, that there may be another class developed along lines that coincide with Dr. Black's latest views, making three principal classes, instead of two, as at the present time. If another class is developed along the lines suggested by Dr. Black, or along other lines, it will, with the present tendency in the development of the cements, help the profession to realize that they have been asking too much of the makers of plastics when they ask for about all the desirable qualities in one product. It will, in my opinion, help the profession to realize that they must understand the difference between plastic filling materials as well as dental medicines, if they are to get the best results. Should the class of alloys that Dr. Black suggests now be developed to the extent that his former alloys are, the profession will be confronted with the question, "Are you willing to exchange his former alloys for the newer ones which are harder to manipulate and of a poorer color, for the sake of less change in volume and better strength, or will you adopt both classes and aim to place them where the qualities of each are of most importance?" You are confronted with the question now to some extent, but as Dr. Black's latest word on the subject is heeded by more of the manufacturers, as it probably will be, you will have to choose between the two or adopt both, if something else is not presented. If you adopt the alloys without the zinc, and really set out to handle them as they should be, you will realize as never before the abuse to which his former class has been put, through quack notions and lack of understanding of the nature of the material. These alloys work hard, of course, but what of it? Will the profession continue to treat these alloys the same as other alloys intended for amalgam fillings, or will they select the harder ones as objects for exceptionally vigorous grinding in the short time that they remain plastic? The clinic in connection with this paper, I trust, will serve to arouse your leaders, at least, to the fact that if the former alloys of Dr. Black are to be improved, or if the newer ones are to be handled successfully, you must put more of the filings in solution in the mercury at the time of making the filling. You cannot stir the two a moment or two and insert the mass in a tooth and expect anything but a great increase in volume. The profession has given much attention to the details of other parts of the work, but seems to have generally overlooked the fact that the very best they could do with a cool mortar and room temperature was to affect but a partial combination of the alloy and mercury. One part of the details referred to is that of weighed proportions of alloy and mercury. Many of the profession have the mistaken notion that the alloy and mercury can combine in definite proportions only and that if they weigh the two they have accomplished the thing of most importance, overlooking the fact that if they were to affect a complete union of two they would need a crucible and considerable heat and agitation. As soon as some of the filings are dissolved in the mercury, the mass begins to set, and as soon as enough filings have been dissolved to make the mass set quite promptly it is inserted in the tooth without reference to a complete union or definite proportions.

Other parts of the work, such as trituration, removal of excess mercury, packing, etc., have had special attention given them, but the matter of vigorous grinding and working has been neglected.

From this discussion we may conclude:

*First*: That while amalgam has many objectionable qualities, it serves such a valuable purpose that its use should be limited, rather than eliminate the material from practice.

*Second*: The amalgam that possesses the greatest number of desirable properties may not be the most desirable for all cases.

*Third*: The greatest objection of amalgam previous to Dr. Black's work was decrease in volume, and, since his work, increase in volume.

*Fourth*: The profession has changed decidedly since the days of Townsend and Flagg on what constitutes a good filling material.

*Fifth*: The question has arisen whether or not the profession is willing to use alloys without zinc for the sake of less expansion after being made into fillings.

*Sixth*: Neither the former nor the latter alloys suggested by Dr. Black are worked sufficiently long and vigorously with the mercury to give the least increase in volume and greatest strength.

## THE FABLE OF THE GRASPING MILLIONAIRE

There was once a Man who had a Mean, Grasping Disposition and One Hundred Million Dollars. Notwithstanding his Great Wealth, he was not satisfied, but used to lie awake nights, depriving himself of much needed rest, in order to think up New and Original Ways of getting the Better of People. One day he found it necessary to fill a Certain Position in his Office, but the Man he selected was something of a Grasper himself, so when the Question of Salary arose, a Difference of Opinion arose also. And the Man thought that his services were worth More than they really were, while the Millionaire thought they were worth less than they really were. Finally the Prospective Employe offered a Suggestion. Said he: "I will work for you for One Year, on Contract, and for Remuneration you shall pay me One Cent for the First Week, Two Cents for the Second Week, Four for the Third, Eight for the Fourth, and so on, Doubling the Amount for each of Fifty-two Weeks. Of course, towards the End of the Year, the Amount will be much Larger, but in the Meantime you will be having the Use of the Money. How does this Proposition strike you?"

The Millionaire thought a Moment, and the Idea sounded Good to him. "Wait," he said; and Hurriedly he took pencil and paper and did some figuring. He found that at the end of Ten Weeks the Man would have drawn altogether Only $10.23, so the Millionaire hesitated no longer, but drew up and signed the necessary Documents.

This is all of the Story, except that at the End of the Year the Employe had all of his Employer's Hundred Million Dollars, and the ex-Millionaire owed him $45,035,796,273,704.95 besides.

The moral of this Fable is that it doesn't always pay to be a Pig.

# BIOLOGICAL THERAPEUTICS IN PYORRHEA ALVEOLARIS: AUTOGENOUS METHOD.*

BY J. H. WOOD, D.D.S., LEXINGTON, KY.

THE SUBJECT upon which we are about to touch is one that has always been, in the past, looked upon as the ghost in the list of diseases that come under the observation of the dental profession. Many, probably all of us, have attempted to discover its mysterious origin, or to determine its diathesis. In this, many of us may think that we have been successful, and have at once had dreams of the time when our reputation as "the dentist" who can cure pyorrhea alveolaris has become so great that we can begin to specialize in this work, and save not only the teeth, but in so doing protect the health of all who come to us before it is too late.

As a rule, however, we awaken from our dreams before they become nightmares, because some other investigator comes along with a theory differing widely from our own, and shows us that we are wrong, or because we find that the case we thought we had cured of pyorrhea was not pyorrhea at all, but something else that would have gotten along all right, anyhow, if the proper prophylactic measures had been taken, and our treatments left off entirely.

Every time we cleanse a filthy set of teeth and find a little pus at the margin of the gums, we are too prone to decide at once that we have found a case of true pyorrhea. This frequently is the condition found, but it is frequently not the condition when we are led to believe that it is. These cases of mistaken diagnosis are the ones that lead us to believe that we have found a sure cure for this widespread and unconquered disease, when in reality a little clear water combined with a good brush and vigorous brush massage twice or three times a day, would probably bring about better results than our medicinal treatment.

At present the medical profession is very enthusiastic about the Bacterial Vaccine treatment for the cure of all localized infections of a low grade, such as ordinary skin eruptions, boils and ulcers, acne, gonorrhea, and such. This enthusiasm seems very justifiable according to the results obtained. Old infections that have baffled all previous treatments applied, have yielded very readily to the action of the Bacterine solutions. If these infections yield to the Bacterine treatment, there is no legitimate reason that Pyorrhea Alveolaris should not be a typical infection, in which this treatment is indicated.

Biological investigation has shown, beyond a doubt, that this is a bacterial disease, and, judging from the fact that the pus is always discharged around the gingivae, even when the pockets are deep seated, instead of boring through the alveolus and gum, as in the case of dental abscess, leads us to infer that the bacteria are of the pus-forming variety known as Staphylococci, and it is the general idea where investigation along this line has been made, that this disease germ is either the Staphylococcus Pyogenes Albus, Aureus, or Citreus, or at times a mixed infection containing any two, or possibly all three of these. After having made a very careful study of this disease in a bacteriological laboratory equipped for the purpose, and with the use of the laboratories of the State University offered to me to use at any time, I have come to the conclusion that the pus from the pockets around the teeth affected with Pyorrhea Alveolaris may contain not only one or all three of the Staphylococci Pyogenes Albus, Aureus and Citreus, but contains practically at all times the Streptococcus Pyogenes, this latter being the bacterium of dental abscess. Pyorrhea never forms a fistulous opening on the gum, for the reason that the deep pus pockets are formed after the ravages of the disease have already made an opening from the gingival border to the seat of the deep pockets, allowing the pockets to drain through that channel and thus averting the boring action of the streptococci.

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*Read before the Kentucky State Dental Society, 1912.

The bacteria mentioned attack the alveolar periosteum, after the destruction of which the alveolar process is left in such a condition that it remains a constant source of irritation to the surrounding tissues until it is absorbed or removed mechanically.

A sharp edge or point of bone can frequently be felt with the probe as we are exploring the deep pockets of a badly affected alveolus. Such points cause the soft tissues circumjacent to become congested and sore. The gums bleed easily, and the patient thinks that it is the wrong thing to brush them when brushing makes them bleed, hence we find in most cases that have reached this stage, a filthy condition to make matters worse.

Frequently other bacteria besides the ones mentioned are found in a culture from a pyorrhea infection, but are generally recognizable as some known germ, or the same ones occur so seldom as to preclude the possibility of their having anything to do with the infection. The Bacillus Tuberculosis is frequently found, and in regard to this virulent bacterium we should be especially careful, if it is present in our cultures in any appreciable numbers.

Thus far we have touched only upon the disease and its conditions as we find them after the infection has become well developed. The treatments usually relied upon in the past have been practically uncertain, or, we might say, practically certain not to cure Pyorrhea. There is no doubt that the ravages of the disease have frequently been checked, usually for a short time; then we see the same old trouble, only just a little bit worse than it was before. The reason is simple. The system is not fighting the disease, and we have only been making the vigorous little bacteria sick with our treatments, instead of destroying them.

The white blood corpuscles, or phagocytes, are the soldiers that guard the body against infection, and whenever any infection becomes malignant it is because the phagocytes, for some reason, are not doing their duty, or have by some means become overpowered.

If we now examine the white corpuscles under a high-power microscope we will find them to be inert as far as the bacteria in question are concerned. You will not find them ladened with the germ they should be fighting to destroy.

Science has determined that the power of the phagocytes is due to the presence of opsonins in the blood. The duty of the opsonins seems to be to capture and deliver to the phagocytes for destruction the invading bacteria before they have a chance to cause infection, and by this means prevent them from causing any local or systemic trouble.

If we have a patient with pyorrhea alveolaris and examine the phagocytes under the microscope, we will find none of the bacteria causing the infection engulfed therein, showing that something is lacking to cause the guardians to do their duty.

It has been found that the introduction into the system of bacterial vaccines favors phagocytosis by increasing the opsonins in the blood, thereby raising the opsonic index, thus increasing or raising the low resistance of the system to that particular germ to a high resistance. This will be shown to be the case if you will, after introducing the vaccine and waiting a sufficient length of time, again examine the phagocytes under the microscope. You will now find them ladened with the very germs that you want to destroy, which shows that the system is beginning to rid itself of the bacteria that are causing the infection that we have under consideration.

In the treatment of pyorrhea alveolaris by the bacterial vaccine method I believe it to be imperative to use the autogenous bacterine, as the infection is so mixed as a usual thing, and there are so many different strains of the staphylococcus and streptococcus, that the use of the stock vaccines would seem to indicate failure.

Unless well prepared to make the autogenous bacterine ourselves, it is strongly advisable for us to get some competent bacteriologist to make it for us. It is work that entails great care and thorough knowledge of the technique, for there are quite a number of side issues, besides the simple incubation and emulsification that demand our most careful attention. If we are considering the staphylococcus, as we surely must in the case of pyorrhea, we must not forget the discovery of Van der Veldt, who found that staphylotoxins cause hemolysis. Nearly all of the pathogenic species of staphylococci yield these toxins, whether albus, aureus or citreus. It is not formed by the non-pathogenic species. This toxin is destroyed by exposure to a temperature of 56 degrees centigrade, for twenty minutes. The hemolitic toxins produced by certain streptococci have laked blood and proven fatal in experimental cases, but will succumb to a temperature of 70 degrees centigrade, continued for two hours. Hence we see, that while extreme care is needed we can, by careful technique, eliminate all danger.

The technique of administration is very simple. Every aseptic precaution must, of course, be observed. To cleanse and sterilize the syringe is the first step. I use an all-glass syringe that can be boiled without any injury to it whatever. The skin, at the point of injection, should be cleansed with some antiseptic solution. Alcohol is very good. Always choose some place for the injection as far as possible from any glandular locality. I inject between the shoulder blades, first on one side and at the next operation on the other side.

The standardized solution contains about 500,000,000 bacteria to the cubic centimeter. The initial dose should not exceed 100,000,000 bacteria, or 1/5 of a cubic centimeter of standard solution, in a normal saline solution. I have found the normal salt solution to act as well in every way as the physiological salt, both of which I have used, and the normal salt solution is certainly much easier made.

The local and physiological reaction of the patient should be closely observed, especially after the initial dose, and the temperature and other manifestations indicating the negative phase should be carefully noted and used as an index for the size of our next dose.

After the initial injection the temperature generally increases slightly, followed by a slight headache and backache, and general feeling of depression some time during the first twelve hours after the administration. This is usually followed by a feeling of buoyancy. The local reaction manifests itself by an indurated area about the size of a dollar or smaller, according to the size of the dose.

Never increase the dose as long as any reaction occurs. Rather decrease it and then gradually increase as the patient can stand it without showing any reaction at all. We should never be in a hurry. The best results are obtained by taking all the time needed and very gradually increasing the dose until no reaction can be obtained no matter what amount of dosage we inject. The pus will disappear, and unless the bony support of the teeth affected has been entirely destroyed, we will be rewarded by seeing them gradually tighten nicely and resume their normal functions. Any tooth that may be loose on account of lack of alveolar attachment should be splinted and given a chance in that way. One-third of the alveolar attachment left in good condition is very frequently sufficient to hold the tooth firmly enough for it to perform its normal functions.

Of course, the teeth must be thoroughly scaled at the beginning of the treatment and every particle of calculus must be removed, no matter how far up on the root it may extend. The use of amonium bifluoride or aromatic spirits of sulphuric acid, properly applied, is recommended to sterilize the pus pockets and to remove any small scales that may have been missed by the scaling instruments. All sharp points of unabsorbed process must be removed or smoothed so as to be non-irritating. Bacterial vaccine will bring about the destruction of the bacteria involved, but as long as a constant source of irritation is present the teeth will never tighten and the gums will remain soft, congested and spongy.

Local treatment and prophylaxis are necessary if we expect to obtain the desired results from biological therapeutics.

As pyorrhea usually accompanies arthritis, or other diseases having a gouty diathesis, it would seem to indicate that the patient should be put on a non-nitrogenous diet.

My clinical experience with this method of treatment has been limited, but with the cases that have presented and have been finished the results have been most satisfactory to both the patients and myself, and it is only reasonable to believe that the opsonic index once raised and the phagocytes stirred to action, that they will keep up the work of systemic sterilization in regard to the infection that we have been treating, until the last bacterium has been disposed of. That this treatment will render the patient immune to future infection I firmly believe, and can refer to such authority as Dr. Ehrlich.

The repeated injection of bacterial vaccine into the system will produce a blood serum containing immune substance called bacteriolysin, produced by the endo-toxins carried by the bacterine, which is specific in the destruction of the bacteria of the same species.

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## SOME SALIENT POINTS IN CROWN AND BRIDGEWORK.*

BY DR. D. R. PHELPS, LYNCHBURG, VA.

WHEN indicated, crown and bridgework as a means of restoring lost and broken-down teeth to their former usefulness, is the most rational method within the scope of modern dental science. I will not attempt to discuss or even name all the various crowns and different forms of bridgework, but will endeavor to present only a resumé of this vast field.

When the mechanical engineer has contracted to build a bridge he looks well into the foundation upon which he is to erect the superstructure, knowing the disastrous results of using abutments which will not resist the force brought to bear upon them. Likewise it is, above all, extremely necessary for us, the *artists* in bridgework, to build upon firm foundations. Whenever the root canals are involved, absolute assurance of their aseptic condition is *the* prime and initial *necessity*. Next we must bear in mind the important fact, that to gum irritation is due, in large measure, the presence of pyorrhea; therefore, in adjusting your bands, discs and shells or any other methods of attachment, beware of faulty adaptation in any form whatsoever. A case in illustration, not of resulting pyorrhea at the time of presentation in my office, yet *one* result of defective work. A lady came to me complaining of a throbbing toothache located in the lower first molar on the right side, a shell crown being in position. Upon examination I found that an explorer could be inserted between the crown and root; then I became suspicious, and, upon further exploration, ran my instrument into a cavity up under the edge of the crown and received a response as to an exposed nerve: upon removing the crown I found my diagnosis to be correct in every particular. Now, if this tooth had been shaped properly and the crown accurately adjusted during the original operation, no caries would have resulted. A bell crown tooth is very difficult to shape for a shell crown, but the time spent is *absolutely* necessary for efficient results. In every instance where a band is to encircle the root or neck of the tooth, shape so that the largest circumference is just beneath the free margin of the gum: then and only then is absolute adaptation assured.

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*Read before the Virginia State Dental Society, 1912.

Prophylaxis is, and rightly should be, the by-word of modern dentistry—yet construct your crowns and bridges so that debris may find ready lodgement and be almost impossible of removal, and you have created a condition the like of which it is almost repulsive even to mention.

Thanks to progressive minds, crowns and bridges which will comply with every law of prophylaxis *can* now be constructed. Let us, then, gentlemen, strive not to deserve the slur cast upon American dentistry by an eminent London surgeon, who *must* have seen some such condition as he described or else there would have been no occasion for his assertion.

After asepsis and prophylaxis have been well looked to, let us not forget the importance of strength and the masticatory usefulness of our crowns and bridges. For instance, what good does a posterior bridge, without cusps, do as a mechanism for triturating food? Yet I have seen such.

Then last, but not least, comes the esthetic appearance to be maintained at all times, for asepsis, prophylaxis, strength and masticatory usefulness can all be secured in conjunction with the esthetic. The unnecessary display of gold is displeasing to the eye of every progressive, modern dentist: therefore, beware lest by your gold crown they shall know you.

Gentlemen, suppose a patient, having lost the four upper incisors, were to come into the office and say, "Doctor, I want you to make me a bridge." How would you proceed—granting that the canines were absolutely sound? Would you use gold shell crowns for abutments? In the name of progress, let us *hope* not. Thanks to an ingenious mind, we have another method, and we do not have to devitalize the nerve to employ it, nor do we make an unsightly display of gold. The hood abutment, or staple crown, and the cast gold inlay, the latter, in this form, an outgrowth of the first, are in my opinion the ideal abutments for such a bridge. Here we have strength, cleanliness and beauty combined. As with this bridge, so with all bridges, employ hoods and cast inlays as anchorages wherever possible, so as to avoid the gum irritation consequent upon the use of shell crowns, which too often impinge upon the peridental membrane or stand off from the root of the tooth.

Do not, I beg of you, get into the habit of routine work or of constructing each crown or bridge by a stereotyped pattern. Let each case be a law unto itself; make a close study of the individual patient's individual needs. Then, and not till then, will you stamp *your* work with *your* personality and give to it that distinctive individuality and esthetic appearance so much to be desired.

Many will doubtless consider the above to be obvious facts and therefore unnecessarily mentioned, but so often do I see them disregarded that perhaps it were well to remind you of them.

With these few suggestions and danger signals to warn us of the shoals upon which our crown and bridges may be wrecked, let each go forth determined to do his *best*, and the *best*—may it grow *better*.

## PERIOSTEAL ANESTHESIA FOR SENSITIVE DENTINE OR REMOVAL OF PULPS OF ANTERIOR TEETH*

### BY DR. BENJAMIN MASSELINK, KALAMAZOO, MICH.

Briefly speaking, the operation consists in injecting, below the periosteum near the root-end of the tooth to be anesthetized, from ten to thirty minims of either of the following solutions:

Solution No. 1—

| | |
|---|---|
| Cocain Hydrochloride | 4½ grs. |
| Chloretone | 1 gr. |
| Physiological Salt Solution, q. s. to make | 1 oz. |

Add 1 minim Adrenalin Chloride (1 to 1000) to every 30 minims of the above solution as needed.

This makes approximately a 1 per cent cocain solution.

Solution No. 2—

| | | |
|---|---|---|
| Novocaine | 1. | part |
| Thymol | .033 | parts |
| Sodium Chloride | .45 | parts |
| Distilled Water, q. s. to make | 50. | parts |

Add 1 minim Adrenalin Chloride (1 to 1000) to every 30 minims of the above solution as needed.

The above solution is approximately a 2 per cent novocaine solution.

In lieu of Solution No. 1 the writer has sometimes used "Codrenin R A," made by Parke, Davis & Co., diluted with an equal amount of distilled water, with very satisfactory results as the formula, after such dilution, does not vary much from formula No. 1.

After many experiments (over 3,000 in number) the writer has come to the conclusion that Solution No. 1 is the more effective and is safe if properly used. In the above experiments not one serious case of toxemia was experienced. It has the advantage also that the great majority of dentists are familiar with cocain anesthesia.

Solution No. 2, although not quite so effective in the majority of cases, is three times less toxic than Solution No. 1, and therefore advisable in weak patients and in those with functional heart or kidney trouble, where cocain is always contra-indicated. It is non-irritating to the tissues and, therefore, in diseased conditions of the gums or mucous membranes, is preferable to the cocain solution. It has the further advantage that it can be sterilized by boiling whenever desired without impairing its efficiency.

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*Clinic before the Southwestern Michigan Dental Society, 1912.

The object of the injection is to anesthetize the nerves leading to tooth to be operated upon. A careful study of the alveolar process will disclose the fact that numerous small canaliculi lead from the periosteum to the interior spongy part of the bone. Under pressure of the injection below the periosteum the solution will be forced through these canaliculi in the spongy part of the bone, and hence comes in contact with the nerves leading to the tooth.

The technique will vary somewhat with the different teeth, but at the clinic the following two typical cases presented themselves:

*Patient No.* 1.—Lady, 20 years of age, in good health, upper left lateral badly decayed, pulp very nearly exposed; tooth aching. It was thought best to remove pulp.

OPERATION.—Gums and mucous membrane painted with tincture of iodine for the sake of asepsis. Injected 15 minims of Solution No. 1 near root apex below periosteum labially. Waiting period, six minutes; result, pulp removed, apparently absolutely painless.

*Patient No.* 2.—Lady, 25 years of age, good health, five cavities in lower teeth near gingival line from right central to second bicuspid, inclusive; so sensitive that patient cannot bear touch of instrument.

OPERATION.—Gums and mucous membrane painted with tincture of iodine. Injected Solution No. 1 at mental fossa and mental foramen, using in all about 30 minims. Period of waiting, about eight minutes; result, cavities all excavated and patient claims that there was absolutely no pain. Duration of anesthesia, about thirty minutes, after which sensation was gradually restored.

In posterior teeth this method is not universally successful, and so-called conductive anesthesia must be resorted to, but this is beyond the province of this clinic. After the operator has learned to have confidence in himself and has mastered the technique of injection, the failures indeed are very few, and nearly all operations on anterior teeth may be done absolutely painless, to the great relief of both operator and patient.

The after effects are nearly always good, provided, of course, proper antiseptic precautions are taken and pure drugs used.

The initial pain of the insertion of the needle may be greatly mitigated by the application of a strong solution of either cocain or novocaine on the mucosa at the point of injection.

The above is merely an outline of the general principles involved, and the dentist who desires to become proficient in either periosteal or conductive anesthesia, or both, must carefully study the anatomical structure of the osseous frame of the maxillæ and mandible, as well as the nerve supply. He should not become discouraged if at first he does not always succeed. The study of such a work as "Fisher's Local Anesthesia in Dentistry," published by Lea & Febiger, Philadelphia, Pa., will be of great benefit.

# ANATOMICAL ARTICULATION — PLAIN AND PRACTICAL INSTRUCTIONS FOR THE PREPARATION OF MODELS.

BY ROY L. BODINE, D.D.S., INDIANAPOLIS, IND.

Build the upper base-plate, having occlusal surface or plane parallel with a line from the tragus of the ear to the alus of the nose. Trim until it is about one and one-half mm. longer than the upper lip at rest, and chill.

Build the lower base-plate. While soft place both base-plates in mouth and instruct the patient to close the jaws until the lips touch lightly in repose. The chilled upper base-plate will give the proper occlusal plane to the lower one. Build or trim them until you have the fullness desired, making them as full as possible in the cuspid region.

Mark the angles of the mouth, the median line and the high and low lip lines.

Place small lump of wax on the center of the posterior border of the upper base-plate and insert both in the mouth. Instruct patient to place tip of tongue on this lump and close. This will cause the retraction of the mandible to its proper position. Attach the two plates together by staples or with the hot spatula, and remove from the mouth.

Make pencil marks on the cheek over the head of the condyle. Warm the mouth-piece of the Snow face-bow and insert in the upper base-plate, while they are held tightly together on the models. Insert in the mouth. Adapt the face-bow, having the pointers exactly over the marks on the face, and the same number of marks visible on both pointers. Lock firmly and remove all from the mouth together.

Set the bows of the (New Century) Snow articulator parallel. Slide the pointers of the face-bow clear in and lock. Slip the recesses in the pointers over the pins on the joints of the articulator. Place the upper model in position and attach with plaster to the upper bow, having the occlusal plane parallel with the bow. Invert and attach the lower bow.

Remove the base-plates, and separate them. Attach the bite gauges to the occlusal surface of the lower base, one on either side, in the region of the second molars.

Insert in mouth and instruct the patient to close, with the lower jaw protruding one fourth of an inch, until the base-plates touch at the median line. Fasten them together with staples; remove from the mouth and seal them firmly together on the lingual sides.

Loosen the set screws governing the condyle slot, and unhook the spring. Place the base-plates, still sealed together, on the upper model, and seal fast. Place the lower model in the lower base-plate, with slight chopping motion. This will adjust the condyle slots to the proper slant. Lock the set screws; remove the staples and bite gauges and re-engage the spring.

You are then ready to arrange the teeth, feeling confident that the movements of the mandible are accurately reproduced on the articulator.

# DEVITALIZED TEETH AND THEIR TREATMENT.*

BY DR. C. E. HARPER, DANVILLE, VA.

OFTEN the greatest value derived from a paper read before a body of scientific men is not in the paper itself, but in the discussion following. A subject may be so treated by a writer that it contains very little value, but great benefit may be derived by causing some member to discuss the subject and bring out valuable ideas.

Having this idea in mind, I venture to write upon a subject that is of vital importance to the dental profession. As I may say nothing important or new to the members present, I yet hope to throw out some ideas that may be of benefit. What I will have to say will simply be stating my methods and the practice I have been following for a number of years, not always with success, but I believe with average good results. I do not wish to make it appear that my method is better than that followed by others, it may not be nearly so good, yet I present it for what it is worth.

We may say that the present practice with respect to the treatment of dead teeth separates the old from the new, placing dentistry upon a scientific basis. The old method of fifty or more years ago, of either extracting a dead tooth or drilling a hole into the crown just under the margin of the gum and leaving the tooth to its fate, is very different from that practiced today. The old method was very crude, the new scientific. At the present time there is scarcely any reason why a tooth should ever be extracted, and we should firmly refuse to extract unless, in our judgment, it is necessary; nothing said by the patient should cause us to do what we know ought not to be done, and then try and lay the responsibility on the patient.

There are two general classes of teeth that we are called upon to treat: *First*, when we find the pulp exposed, and we conclude that destroying its vitality is the only sure method of success; and *second*, when we find the pulp already dead. When we find the pulp exposed and we decide that it is necessary to destroy it, we have several methods by which this may be done. The method that has been most universally used is arsenous acid, made into a paste with creosote. Cocain has and is being used under certain conditions, and is very valuable and by some is considered the best method. It is used, as we all know, by means of pressure, and in this way the pulp is rendered insensible and removed, in a great many cases, without pain. The method I have used is to take one of the prepared cylinders of cocain and adrenalin, and after removing as much of the decayed tooth as possible, place the cocain in the cavity, covered with a small piece of moist cotton, covering this with a piece of vulcanite rubber, followed by a piece of cotton, to prevent puncture. Pressure can be exerted by a ball burnisher forcing the cocain through the dentine into the pulp. Then excavate as much as patient can bear and repeat the operation until the pulp can be removed. Some practitioners immediately fill the root or roots, but I believe it is best to wait and allow the hemorrhage to entirely cease before attempting to fill the canals. Arsenic has been used for a long time. Harris' "Principles and Practice of Dentistry" give credit to the first employment of arsenic for the destruction of the pulp to Dr. Spooner of Montreal. And in 1835 it was recommended to the profession by his brother.

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*Read before the Virginia State Dental Society, 1912.

Arsenic is applied on a piece of cotton, placed in the cavity and covered with cotton saturated with varnish and allowed to remain from twenty-four to forty-eight hours. In very young persons it should not remain longer than twenty-four hours, and the sooner the pulp is removed, especially in children, the less chance there will be of discoloration of the tooth. Some object to putting arsenic in children's temporary teeth. I never hesitate to do so if I think it necessary, and have never seen any bad results, but we should use the very smallest quantity.

There is another method of destroying the pulp that has been practiced by some, that of opening the cavity and exposing the pulp, driving a wooden peg into the canal. The advocates of this method say it doesn't hurt. Prof. Gorgas of the University of Maryland, in his lecture on this subject, said that the testimony of the patient was worth more than that of the dentist, and with him I agree.

We must remember that the death of the pulp destroys only the life of the dentine and not that of the cementum; the life of the cementum being supplied by the periosteum. This accounts for the fact that we so often find the end of the root sensitive after all the pulp has been removed. And we should not try to destroy this sensitiveness, especially by the use of arsenic in the canal, which might result in its being absorbed through the end of the root and destroying the life of the periosteum.

In filling the canal it is not necessary to fill the part of the canal between the end of the dentine and the cementum.

I come now to the most important part of the subject, the filling of the canals after they have been placed in an aseptic condition. Since it is a recognized fact that the worst condition a dead tooth can be left in is to leave the canal entirely open, it follows that the best condition is to have the canals permanently and perfectly filled. Each root filled from the pulp chamber to the end of the dentine.

I believe that in proportion as this is done, so will be the success of our efforts. Now, how can each root be filled to its end? This I recognize is impossible in all cases. We have to take into account crooked roots, teeth far back in the mouth, very small canals, etc. I believe a great deal of this can be overcome by reaming out all roots as far as possible. I know there are many who greatly object to reaming out the canal, and a great many never ream a root canal. But I believe, as a whole, it is best. That while in some cases damage may be done, I believe as a whole, for the salvation of the teeth, more good is done by the careful use of a reamer than is accomplished by never reaming.

I have seen so many cases where, on account of the smallness of the buccal roots of the superior molar and the anterior root of the lower molar, no attempt had been made to fill these roots. I have had these cases come to me, the tooth giving trouble, and on reaming out these roots treating and filling, the teeth became comfortable and all soreness disappeared. I may say, as a general rule, with few exceptions, I never fill a dead tooth unless I thoroughly ream every root.

In the "*American Text-Book of Operative Dentistry,*" page 457, 2d edition, we find the following: "It has no doubt been observed by every operator how seldom roots which have been well prepared for artificial crowns of the post variety become the seat of pericementitis. This fact suggests that the mechanical removal of the existing boundary wall of the root canal, by removing those portions of dentine invaded by septic organisms, may lessen the opportunity of sepsis."

For the front teeth I use the Gates reamer and on the molars I have been using for a number of years a reamer that I make myself. I have been unable to get this reamer at any of the supply houses, but recently have had some made by special order. It consists of a right angle bur, with the end broken off, soldered to a short piece of wire spring. At the other end of the spring is soldered a pointed reamer that will ream and not bore through the side of the root, the whole reamer, shank, spring and reamer end from an inch and a quarter to an inch and a half in length. By the use of this reamer access can be had to the roots of the third molar, with comparative ease. I use in some cases in the molar where it is easy of access, and the patient is able to open the mouth wide, a stiff right angle reamer that is on the market.

I would also emphasize in this connection the very great importance of enlarging the mouth of the cavity, so as to make each root easily accessible. The danger is in not cutting enough rather than cutting too much. When the pulp is exposed in the buccal surface of a molar, the cavity must be opened to at least the center of the grinding surface. In an exposed pulp in one of the four incisors it is often advisable to open on the palatal surface.

We come now to the filling of the root canals. Harris' "Principles and Practice of Dentistry" gives credit to Drs. Maynard and Baker as the first to call attention to the fact that most of the trouble resulting from the presence of a tooth in the mouth, after the destruction of the pulp, was caused from the irritation produced by the matter contained in the pulp chamber and canal of the root. To prevent their occurrence, therefore, they proposed filling both chamber and root in such a manner as completely to exclude everything else. The accumulation of purulent matter being prevented here, its secretion at the extremity of the root will in a majority of cases either cease altogether or go on no faster than it is reabsorbed, as has been shown by repeated experiments. Then it would seem that the amount of vitality which a tooth derives from the investing membrane is sufficient, ordinarily, to prevent it from exerting any apparent morbid action upon the surrounding parts.

In the year 1850 Dr. Dunning stated to the author of Harris' "Principles and Practice" that he had for several years been in the habit of filling the roots of teeth after destroying their pulp, and also cleansing and filling the roots of the teeth which had previously lost the entire pulp and become more or less diseased. Dr. Dunning used gold as a filling material for the canals and had good success. At the present time gold is not used as a filling material for the canals, it being hard to introduce and impossible to remove if desired.

While I was at college, and for a short time after, I used amalgam; this was in many cases easy to introduce into the canal but very hard to remove. For the past twenty years or more I have been using cement in all canals. This is easy to introduce and, with care, can be removed.

Good instruments for filling the canals can be made of ordinary sewing needles. By heating them to redness and allowing to cool, they can be bent at any angle desired. It is best to make the point blunt by grinding. You can then, with comparative ease, fill any canal. I first mix a little of the cement powder with carbolic acid and place this at the end of the root and then follow with the cement, continuing to pack until the canal is full.

The above is the method I have been using with, I think, average success. Others have their methods, and no doubt meet with equal or better success. The points I wish to emphasize are the importance of thorough removal of all the pulp; thorough antiseptic and disinfectant treatment; thorough reaming of the root canals, so as to remove all decomposed particles, and to enable free access to the canal, and lastly, thorough root filling with some material that will close the canal and not decompose.

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## THE COMBINATION HOME AND OFFICE TREATMENT OF PYORRHEA ALVEOLARIS

BY N. T. PAVEY, D.D.S., JAMESTOWN, O.

THE MEANING of the term Pyorrhea Alveolaris needs no explanation. It is understood by the profession and also by a great number of the laity, and since the term has become so universally used I think it a hopeless task to try and improve it. Of course, we have all read a great number of theories on the cause of this disease, and they all have their good points, but I think that our aim is to produce results. So many of the profession diagnose suppurative gingivitis or some other inflammation of the gums and surrounding parts as pyorrhea, when it is altogether wrong to do so. Let us consider the meaning of the term Pyorrhea Alveolaris—the flow of pus from the alveoli; therefore the term is not properly used when the case in question is an inflammation without the pus. We may have all the cardinal symptoms of inflammation, but unless there is a flow of pus from the alveoli the disease cannot properly be called Pyorrhea Alveolaris.

The cure of pyorrhea is considered by many to be impossible, but I think that it is like any other inflammation. There is an irritant causing the trouble, and when the irritant is removed the inflammation disappears. If a portion of the alveolar process and peridental membrane are destroyed they cannot be replaced, but the remaining parts can be put in a healthy condition.

I never saw a case of pyorrhea in which the affected tooth or teeth did not have a deposit of either salivary or serumal calculus, or both, around their necks and roots, and I claim that pyorrhea is a disease of filth and that it can be cured and obliterated. Of course, as I have said before, the lost parts cannot be restored, but the soft, spongy and discolored gums will become healthy and firm, and the breath will be offensive no longer, and the loosened teeth will tighten and the affected parts will become healthy and non-irritated, and a radical change for the better will be manifest in the patient's mouth after the second or third treatment.

My treatment is one which many dentists have tried part way, but the essential part was omitted, and I have found that the treatment is valueless unless it is carried out in full. To some it may seem a simple treatment, but let us remember that it is like many other simple remedies: it is practical because it brings the desired results. I have worked out my treatment through necessity. I had a very bad case of pyorrhea in my own mouth and I took treatment from some of our leading specialists in the profession in this State, but always with the same results—I received no benefit of any worth. Of course, these results were not very gratifying to me and I became disgusted with the treatment I was taking, and I resolved to work out a treatment of my own. I have cured the disease in my own mouth and also in the mouths of many of my patients.

My treatment is this: When a patient presents at my office for treatment I look for improperly inserted fillings, crowns, etc., and then I put the entire mouth in a hygienic condition by the use of suitable sealer, floss and orangewood and pumice, making sure that all deposits are removed and the necks and roots of the affected teeth thoroughly cleaned and polished. I massage the gums and wash out the pockets with $H_2O_2$, following this with warm water. I then dry the parts thoroughly and after saturating small pellets of cotton in aromatic sulphuric acid, I work this cotton up into the pockets and leave it there while I thoroughly massage the gums. I then remove the cotton and wash out the mouth with warm water, and instruct the patient to come back in ten days for another treatment.

Now comes the treatment which is absolutely essential: it is the home treatment. I instruct the patient to use the home treatment each morning and evening. It consists, *first*, of thoroughly massaging the gums and milking (as it were) the pus out of the sockets; *second*, massaging the gums with a saturated solution of sodium chloride which has been heated as hot as the patient can endure, using a stiff brush and also the fingers, forcing and working the salt solution into all the pockets. When the patient next appears for treatment at the office there is generally a marked change for the better. I repeat the aromatic sulphuric acid treatment and make sure that the teeth are absolutely clean and polished and the mouth in a hygienic condition. I instruct the patient to continue the home treatment and to come back in two weeks, at the end of which time I have always found the gums and teeth in a condition which was very gratifying both to myself and to the patient. After I have administered five to seven treatments I am generally pleased to find the gums hard and firm and the teeth have tightened and all pus has disappeared. I now instruct the patient to keep up the home treatment in a modified way, i. e., by vigorously brushing the teeth with a stiff brush saturated in the salt solution after each meal.

I sometimes deem it advisable to dilute the acid after the second treatment, being governed by the action on the case in hand. Of course, the results depend to a great extent upon the patient. I am well pleased with the results in my own mouth. I am of the opinion that after the pus germ is obliterated and the tissues healthy the cementum, by means of its osteogenetic power, as it were, fills in the lost parts to a great extent.

With due respect to all the constitutional theories, etc., concerning pyorrhea, I am content in knowing that by the treatment I have described I get results.

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# NITROUS OXIDE AND OXYGEN IN DENTISTRY.*

BY N. T. YAGER, D.D.S., LOUISVILLE, KY.

NITROUS oxide and oxygen is fast occupying a very prominent place in dentistry aside from being used in extraction and minor surgery.

The analgesic stage as produced by its administration for the preparation of cavities and innumerable other slight operations which would otherwise cause the patient pain, is fast becoming a method of routine practice. My prediction is that the time is not far distant when every well-appointed office will contain an outfit. This may seem a broad assertion.

If we can prove the method practical, this broadness will be eliminated.

*First*: The analgesic stage, as produced by simple procedure. So simple that the average office maid can in a short time be taught to handle the outfit successfully. Patients who have taken it quite often become their own anaesthetist, but an assistant is necessary at all times.

*Second:* So far as I have been able to learn, there are no contra-indications to producing the analgesic stage.

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*Read before the Kentucky State Dental Society, 1912.

*Third*: In relieving the patient of the pain, you gain a confidence that is almost unshakable.

*Fourth*: You are robbing dentistry of many of its horrors.

*Fifth*: It will improve your practice in many ways, especially financially, and,

*Sixth*: A little education, and the public will demand its use.

All of the foregoing reasons are, in the main, applicable to the analgesic stage, and not to the profound stage necessary for the extraction of teeth or performing surgical operations. This is entirely a different proposition.

I do not think an attempt should ever be made to extract teeth in the analgesic stage. While there may be many reasons why dentists of today are sending their extractions to a specialist, the elimination of pain is the greatest one, and just as soon as the public becomes acquainted with the fact that a similar method can be used for the other more or less painful parts of dentistry and without any danger to them, they will demand it.

I hope I will not be misunderstood. Do not think I am looking only from one side of the proposition.

Analgesia is practical, and I believe has come to stay. Don't judge entirely from public clinics, for those who have had any experience in giving them know that results are often different than that obtained in private practice. A failure in a clinic would be a success usually in a private office. The manufacturers are recognizing the practical side of the subject, consequently there are quite a number of outfits on the market, all giving results.

I don't see that the expense should play a very prominent part, as has been suggested by some. Deliver the goods, and the expense will be secondary.

Educate yourself, and then the public.

I do not think it would be too much of a digression, in closing this paper, to call attention to a few facts in reference to the history of nitrous oxide, also the combination with oxygen.

Nitrous oxide was the agent used, and a dentist was the discoverer of modern anesthesia. A discovery that has done more toward the mitigation of human suffering than any other known.

It is also through the dentist, in the main, that the technic of nitrous oxide and oxygen has been developed, not only for producing the analgesic stage, but surgical anesthesia. For these things alone we should be proud of the fact that we are dentists.

In conclusion, let me say, I think it would be a most fitting tribute to Dr. Horace Wells, the father of modern anesthesia, to have placed in every dental college a memorial tablet. The good men do here lives after them.

# A STORY OF THE PAST

BY WM. C. CARR, SEATTLE, WASH.

In 1868 I returned to my home town after spending a winter in the medical department of the University of Michigan, and on entering the dental office of Dr. B—— I was invited to look at the condition of a young woman's teeth. I noticed grooves across the necks, and also the gums were receded. I asked the dentist the cause. His reply was that the tooth brush did it. I answered, "Then if that is so. I will brush my teeth up and down, and not across." I took my brush and shears and cut the bristles out so it let the full length bristles go in between the teeth and the short bristles hit the high surface. I found by doing so the bristles would not mat and break. In 1874 one of the University professors called to have some dental attention, and I said to him that he ought to brush his teeth. His reply was that he did not believe in the tooth brush, that he cleaned his teeth with his silk handkerchief. The reasons he held were the same as I have given above. I showed him that the reason he condemned the brush was that he did not use it the right way, and that if he would take a brush properly prepared and would place the brush low or high on the gum and rotate, that he would massage the gum festoons and press food particles from under the border, and could grow the gum back from where it had receded. I told him he ought to have a molar filled on left. His reply was the same, that he did not believe in filling. I asked how it was he had a molar on the right filled. He said that he never had a tooth filled in his life. When I showed him a gold filling on the right molar, he reflected and made this reply: "Well! well! I had that tooth filled more than twenty years ago in Australia." Then I convinced him of the necessity of using a tooth brush and, of more importance, to use the silk floss, by separating the strand and removing the food from between the teeth. If anyone doubts the efficacy of the above mode of caring for the teeth, let them look at my teeth and gums, at sixty-two years of age, and when I tell them that at seventeen I had a central incisor with pulp dead, and many others decayed, with tartar all over them, with gums bleeding and unsightly, and now not a single (or double for that matter) one missing, with gums healthy as a babe's and breath as sweet as new mown hay. I can thankfully say, "Praise the Lord," for my teeth give me all the satisfaction and are repaying me for brushing them twice a day and using silk floss three times a day, with a chew of gum after supper. Has anybody here seen Kelly?

**"Some folks are so busy putting something by for a rainy day that they get little or no good out of pleasant weather."**

# REPORT OF ORAL HYGIENE COMMITTEE.*

BY DR. G. C. BOWLES, DETROIT, MICH.

IN MAKING this report it will not be necessary to go into any defense or explanation of the Oral Hygiene Movement. Every dentist progressive enough to attend a meeting of this kind is a reader of at least one dental journal and is informed of the faith whereon this campaign of education and alleviation is based. The man who never attends a dental society meeting and who never even reads the literature mailed to him, free of cost, yet knows that all about him there exists much needless suffering, much ill-health, much physical, mental and moral impairment due to ignorance concerning the simple fundamentals of oral hygiene, can hardly be called progressive in this age, whatever his attainments. How to dispel this ignorance and how to enable poverty to enjoy the benefits of hygienic oral conditions is the problem which increasingly confronts the awakened dentists of every community. Michigan is awakening and is taking hold of the problem seriously, sanely and conservatively, undertaking only what it is well able to carry out. Detroit, naturally, has taken the lead. The free dental clinic which was established by the First District Dental Society at Grace Hospital is now in its fifth year. So popular has it become that last fall the hospital authorities agreed to provide for its future maintenance, leaving the Society free to devote its attention to the equipment of the new clinic in quarters provided by the Board of Health in the Health Board Building. The dental equipment for both of these clinics was contributed by local members of the profession. The dentist in charge of the second clinic is paid by the city. The medical examiners and the school nurses refer the needy children to the clinics, which are taxed beyond their capacity, being open on Saturdays only, obviously a very inadequate and unsatisfactory arrangement but an arrangement which has served the purpose for which it was designed.

It was realized from the beginning by those having the work in charge that it was better to start out on a scale that could be maintained after the first flush of enthusiasm had waned, as it inevitably does, and then, when the public had been educated to the need and value of the clinics, ask the city to take them over and enlarge their scope. That time having arrived and the way having been paved by the writing of innumerable letters, and the circulation of petitions and by personal visits to editors, aldermen and estimators, under the able generalship of Dr. George F. Burke, the city fathers have been asked for an appropriation of $5,000 with which to more fully equip the present clinics and for the establishment of four additional clinics and, what is vastly more important, the appointment of dentists to do the work now indifferently done by the well-meaning but untrained for the purpose, school medical inspectors. There is every probability that this item will be allowed and Detroit will see established the beginning of the most comprehensive system of municipally controlled school dental inspection and free school clinics in the land.

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*Read before the Michigan State Dental Society, 1912.

From September 16, 1911, to and including March 30, 1912, 1,216 children attended the Grace Hospital and the Board of Health clinics, making 2,709 visits or an average of 2¼ visits each; 666 fillings were inserted, 766 treatments and 397 cleanings were given and 1,460 extractions were made, making a total of 3,289 operations, surely a goodly showing and one pre-eminently worth while.

Since the report of this committee last April the stereopticon lecture, "The Teeth and Their Relation to Health," has been given in nineteen public schools.

On the whole, Detroit has made a worthy start in this world-wide humanitarian movement. But Detroit has no monopoly of the field. The following report from Grand Rapids shows that they are actively furthering the good cause:

### REPORT OF THE ORAL HYGIENE MOVEMENT IN GRAND RAPIDS

In the fall of 1910 a local organization was completed which was really a successor to the old Grand Rapids Dental Society, and out of courtesy to one of the oldest dentists in Michigan, and who is still active in a small way in the capacity of custodian of our museum, it was named "The E. S. Holmes Dental Club."

The principal object of this club was the establishment in our city of a free dispensary, and with that object in view the club set to work. The progress was slow at first and many things were encountered which made the work most disheartening. However, the District Nurses' Association, the Board of Education, and the Charity Organization Society were finally interested and enlisted in the movement, and things began to look brighter.

The Board of Education gave a room in the Grammar School building, put in partitions, laid linoleum, made all gas and electric connections, gas stove, and telephone. They also agreed to pay $25.00 per month to defray the running expenses of the dispensary.

The Charity Organization Society solicited funds from business men sufficient to completely equip the operating room with the very best equipment obtainable.

The members of the club pledged themselves to serve at the dispensary three hours per month.

The superintendent of schools has co-operated with the movement from the first, and the teachers are doing everything they can to help the work along.

The clinic was formally opened October 1st, 1911, and continued to be open three days each week until January 1st of this year, when it was thought feasible to extend the time to five days a week. We find it easier to get results, and also can take care of many more children in proportion with the five-day-a-week system.

A trained nurse is in attendance, whose duty consists in sterilizing and placing of instruments, assisting the operator whenever needed, making all charts and keeping all records, and giving each individual child explicit directions regarding the care of the teeth. While not on duty this nurse investigates the individual cases reported to the clinic by the school nurses, as to their being able to pay for dental work. (No child is admitted to the clinic whose parents are able to pay to have the work done by a regular practitioner.)

The executive committee of the Holmes Club appointed a superintendent of clinic, who is responsible for the conduct of the dispensary as to regular attendant, character of work done, and the general overseeing of the clinic. This man is responsible to the committee, and of course the committee is responsible to the society.

The amount of work done in the clinic will be clearly shown by the following report made to the executive committee of the club by the nurse in charge of the dispensary:

Report of E. S. Holmes Dental Clinic of Grand Rapids.

| | |
|---|---|
| December Report— | |
| Number children treated | 13 |
| Number treatments given | 35 |
| January Report— | |
| Number children treated | 14 |
| Number treatments given | 29 |
| February Report— | |
| Number children treated | 24 |
| Number treatments given | 69 |
| March Report, to and including March 15— | |
| Number children treated | 18 |
| Number treatments given | 55 |
| Total number of clinic days from Dec. 11 to March 15. | 46 |
| Number different children treated | 35 |
| Number recurrent cases | 34 |
| Total number general treatments* given | 188 |
| Including | |
| Fillings (amalgam and cement) | 79 |
| Extractions | 24 |
| Miscellaneous processes | 170 |

### REPORT FROM MUSKEGON

The Muskegon Dental Association, at a meeting held Nov. 17, 1910, voted to submit a proposition to the Board of Education, offering to take charge of a dental office for one-half day a week for a year free of expense, if such an office were provided for them in one of the school buildings. This proposition was received by the Board of Education and accepted at a meeting held Jan. 13, 1911, and the Superintendent of Schools was instructed to equip such an office.

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*NOTE: A general treatment may include cleaning, filling and extraction or any other of the combined processes of dentistry.

Through the kind assistance and advice of Dr. F. J. Quinn, secretary of the local association, and through the courtesy of the C. L. Frame Dental Supply Company, it was possible to secure a high-class equipment. The outfit purchased consists of a Columbia Favorite white enameled chair, a Ritter all cord white enameled engine, a Lee Smith & Son white enameled steel cabinet, a Cleveland aseptic table and white enameled bracket, a Dunn light, a Pelton electric sterilizer, steel instruments and a complete equipment or apparatus and supplies, the total cost of the room and equipment being about $750.00.

The office or clinic is located in a convenient and well-lighted room in the beautiful Hackley School across the street from Hackley Park. All who have used the room so far are enthusiastic in their praise of both it and the equipment.

The school nurse is in constant attendance during the clinic. She arranges for the children who are to receive treatment and takes care of the records of each child. Her method of procedure is as follows:

From the records of the Medical Advisory Board she secures the names of the children whose teeth require immediate attention. From these she selects those who come from indigent families and submits their names to the attendance officer, who decides whether the family is a worthy one and should receive treatment free. If the case is approved by him, a card is sent to the parents notifying them that the child is in need of dental treatment and asking their permission to have this done. The child is then given an assignment at the clinic. Upon arrival at the clinic a record is made of the age, the grade, the school, and the standing of the pupil for the previous six months. This will be followed by the school record of the pupil for the six months following the treatment. In this way it is hoped that definite information in regard to the effect of bad teeth on the progress of the children in school will be discovered.

There are twelve dentists in the city. They drew lots for the dates at which they were to be at the clinic. If they cannot be present, they must provide a substitute. Although this clinic has been running only a short time, it is having a great influence on the attitude of the children towards the care of the teeth. A great many tooth brushes have been purchased and many of the children are having their teeth treated. There is a feeling that this is one of the most valuable departments that has been added to the school system.

J. M. Frost,
*Superintendent of Schools.*

Particular attention is called to the system established at Muskegon for determining, in the only rational way, the relation of the teeth to the mental development of the child. This experiment will be watched with interest and should be extensively copied.

The hustling, energetic Jackson men who are responsible for the admirable free dental clinic in that city have hidden their identity behind the school nurse, to whom our letter of inquiry was referred and who sent the following report:

"The Free Dental Clinic has been held every Saturday morning from September 23d, 1911, to February 24th, 1912, inclusive, with the exception of three Saturday mornings, when school was closed on account of the smallpox epidemic in this city."

The grades in the different schools are examined by the school nurse for defective teeth and poor oral hygiene. She refers them to their private dentists for treatment. At this time a short talk on oral hygiene is given to the grades. If the defective teeth are not treated, a visit is made to the home and the reason for treatment explained. If the parents are unable to secure the services of a dentist the child is allowed to come to the free dental clinic for treatment. Here he is also supplied with a tooth brush and tooth paste and taught the proper care of the teeth. Below is the work accomplished this year at the clinic:

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|---|---|
| Number of patients | 98 |
| Number of cleanings | 22 |
| Number of extractions | 41 |
| Number of treatments | 34 |
| Number of temporary fillings | 27 |
| Number of cement fillings | 19 |
| Number of amalgam fillings | 40 |
| Number of root canal fillings | 9 |
| Number of brushes given away | 63 |
| Number of tooth paste given away | 83 |

Ann Arbor has the distinction of being the first city in Michigan, if not in the country, to regularly appoint a dentist to the position of Public School Dental Inspector. Dr. Anna Dieterle, who received this appointment one year ago, has been accepted to membership in the Ann Arbor Teachers' Club, being considered a teacher of oral hygiene.

In a recent report by the Ann Arbor Board of Education, it is stated that the work of Dr. Dieterle is regarded as a necessity. One thousand four hundred and four children were examined during the year and but sixty-six found free from dental defects. The parents are notified of the oral condition of their children.

The educational value and the far-reaching effect of such work cannot be estimated.

Kalamazoo reports that the establishment of a free dental clinic in that city awaits the completion of the new high school, in which it will be quartered, and that the Board of Education has appropriated $500 for the purpose.

The effort to enlist the co-operation of the school authorities of Port Huron has been successful and the local committee reports that their plans for a free school dental clinic are likely soon to be realized.

It is not pretended that this report completely covers the progress of the Oral Hygiene Movement in Michigan, but it is enough to show that many of our profession have awakened to their opportunities for a high type of social service, and to serve as an incentive and a guide for others to follow in their footsteps.

DISCUSSION

**Dr. Dieterle**, Ann Arbor: I have listened with much pleasure to the report of Dr. Bowles, who has given us reliable information on the oral hygiene subject in our state.

While thoughtful dentists of all nations have combined their sense of responsibility and are striving for the solution of the greatest dental problem the world ever knew, it is gratifying to learn that the State of Michigan is leading a grand procession in the progress and establishing monuments of energy and foresight, which will be potent factors in the preservation of the health of the future citizens of America long after the dental educational campaign has passed into history.

For the past three years I have endeavored to keep informed on all developments relative to the oral hygiene movements in this country, as well as in foreign lands, and now I am directly connected with that part of the work pertaining to dental inspection in schools.

Having rendered service to many children, neglected from a dental standpoint, I gave treatment one day to a nine-year-old boy whose case seemed the most deplorable of all. I became so impressed with the necessity of dental inspection in our public schools, to enable the dentists to get the cases in their incipiency and thereby save the blood and tears of the little ones, that I began to agitate the installation of dental inspection for the children in our public schools. I was actuated by what seemed to be an imperative call to do whatever my opportunities would allow. It was not a self-centered motive which impelled me to undertake this work.

I gave the first message of truth to a local druggist who was well informed on the progress Germany had made in that direction, and he expressed a surprise that our schools, situated in a University City and surrounded by the greatest dental influence in the country, had not adopted dental inspection long ago. His advice was to see the superintendent of our public schools. I did so. The superintendent gave me the working plan of medical inspection as conducted in our city schools, and, what was at this time of greatest importance, assured me "that anything can be established in our schools if it is a necessity in the community and the taxpayers will recommend it." Here was the key to the situation. I began to make personal calls upon influential citizens, those who in a large measure control sentiment, and met with every encouragement. One man offered money as a nucleus for a fund for "free clinic." Some of the dentists assured me that they would arrange to care for indigent children, who could get treatment no other way.

I decided the best plan to bring the expression of these favorably impressed citizens before the School Board would be by a petition with their signatures affixed, so I wrote the following petition:

> "*To the Honorable Members of the Board of Education,*
> "*Ann Arbor, Michigan:*
>
> "We, the undersigned taxpayers of Ann Arbor, Mich., do hereby recommend that dental inspection be introduced in our schools on a similar plan as medical inspection.
>
> "Statistics have shown a great prevalence of decayed teeth and diseased conditions of the mouth among school children. That these ailments have an injurious effect upon the health of the child is proven by the large percentage of cases of malnutrition. Where there is imperfect mastication, there is impaired digestion, and subsequent nervous disorders and lack of resistance for infectious diseases. It has further been shown that headache, earache, neuralgia and blood poisoning are the results of these defects.
>
> "In our aim for the prevention of contagious diseases and physical improvement along with the process of education, we are convinced that we should give

this subject careful consideration and act in its favor, for the reasons before stated, and in order to bring the matter before the proper authorities we hereby respectfully affix our signatures.''

This petition was signed by hundreds of our taxpayers and proved to the school authorities their desire for dental inspection and their willingness to bear the added expense.

On May 11, 1911, at 11 o'clock at night, a member of the School Board notified me that the hopes that I had cherished would be realized; that dental inspection was made a part of the public school system; that the work should commence with the fall term and consist of three inspections.

Since September I have been spending two hours, five days in the week, in the schools. I have completed the first inspection, a part of the report Dr. Bowles has given you. The second inspection is nearly completed and is of greater interest to the child, for I have associated it with an Oral Hygiene lesson, illustrated by the late Dr. W. H. Miller's colored chart of green and brown stained and decayed teeth, with microscopic sections of the deposits. These lessons I intend shall be given in such a way and at such a rate as will permit the child to appropriate it, digest it, assimilate it, and make it a part of itself, even though the faulty oral conditions might suggest to the dentists that such a process be impossible.

My third inspection will be an exhaustive one: to note the improvement, by information given to the parents, urge the care of defects which have had no attention thus far.

The state of teeth is given careful consideration at all times, and the need of surgically clean teeth is made so emphatic to a child who is old enough to comprehend what that means, that he often arranges for prophylaxis and agrees to keep his teeth clean ever after.

All examinations are made in privacy, for a child is extremely sensitive, and a little kind advice given to a neglectful child in a friendly manner, with no one about to ridicule or annoy it, is worth more than many lectures to an entire class.

As the University Hospital gives treatment to many children whose parents or guardians receive the information from the medical inspector of existing disease or physical disorder, so, too, the University Dental College renders service to many children after notification of dental disturbances. Neither medical nor dental inspection, however, have any direct connection with these institutions.

Medical ispection preceded our efforts by nine years. At that time the question arose in regard to controlling authority, and it was settled. The members of the Board of Education believed that anyone in charge of the inspection of children in the schools shall be in sympathy with the teachers and superintendent of schools and shall be closely connected to the public school system, and that medical inspection is a proper function of the Board of Education. For like reasons, dental inspection is under the same controlling authority.

To those of you who are interested in dental inspection on the same basis as medical inspection, my experience may permit me to state: Do not set up a blaze and illuminate the sky in your locality, but quietly utilize the light that the National Mouth Hygiene Association is furnishing you, and with this persistency and earnestly advance to a successful accomplishment.

Do not spend valuable time conducting voluntary dental inspection for statistical purposes, for that was done thirty years ago in Chicago by Dr. Ottofy, and he advocated a systematic and regular examinations of school children's teeth at that time. Do not approve of the appointment of nurses to fulfill the responsible position of a dental inspector. You will lower the plan and the purpose and never be able to elevate it in your community. If ever a competent and tactful dentist was needed it is in connection with the schools, for complex questions arise, many of which will only be solved when there is an organization of dental inspectors who can think and act intelligently on dental subjects. Do not wait for a compulsory dental inspection law, for you know the Owen Bill has been pending for ten years, although urged by all the medical societies in the United States. This shows the slow progress in legal affairs. Make use of the permissive provisions of the public health law, under which you can accomplish much good with little interference. Do this now while the dental educational campaign is at its height.

Should the Medical Freedom League send their lecturer to your city while you are exerting every effort to gain dental inspection, be prepared to lay so low his arguments that they will not rise again in your community, for any man or woman who opposes the early detection of disease and physical defects, and delays the correction of them for our innocent little ones, is doing an injustice to humanity. Do not look to the teaching authority to assist you in the work, for the curriculum is filled, and the overburdened, conscientious teacher will not be able to see how dental inspection can be added without interfering with the regular work, but after you have demonstrated to them that there is a way and a noble purpose, you will have their hearty co-operation.

The following statements have been given me in reference to the dental inspection in our schools:

> ''In my opinion, dental inspection in the public schools of Ann Arbor is a highly desirable innovation.
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> ''From the standpoint of one interested in the development of the voice, dental inspection is of paramount importance. The quality of the voice depends largely upon the shape of the oral cavity and the arrangement of the teeth within the cavity. The timbre and resonance of the voice are greatly affected by the loss of teeth. Hence, a voice cannot reach its fullest development or retain its best quality unless the teeth are preserved in healthy condition. This is only one reason, and by no means the chief reason, why we should profit by dental inspection in our schools.
>
> ''(Signed) FLORENCE B. POTTER,
>
> ''*Supervisor of Music in the Public Schools of Ann Arbor, Mich.*''

> ''The introduction of dental inspection in the schools of Ann Arbor has the entire co-operation of the school teachers, and, to a remarkable extent, that of the parents, while the children themselves are learning to regard the dentist as a friend who has their welfare most earnestly at heart.
>
> ''Since the beginning of dental inspection it is reported by our dentists that a large number of school children have had their teeth treated; many of the children have never visited a dentist before, while now such visits are regarded as quite the proper thing. The system of the examination of teeth in the schools brings to the attention of every parent the faulty condition of their children's mouths. Through the children the parents are being educated, and many expressed a wish that there had been such inspection in their day. Even in the short time since the system has been introduced the results have been most remarkable.
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> ''Recent investigation among school children, moreover, has shown that the child with defective teeth falls decidedly behind in his studies, is frequently absent, and that it takes such a child about half a year longer to go through school than it takes a child with a healthy mouth.
>
> ''The decayed tooth is sensitive, a child does not masticate his food sufficiently, and malnutrition is the result. This is a poor basis for scholarship and the progress in school work. A case in point, a boy in our school who had been restless, irritable, inattentive, frequently absent, and a general source of annoyance when present, was said by his teacher not long ago to be quite a different child, looking better, brighter, attending faithfully to work, conduct excellent, and promotion occurring, when before it had been doubtful. All this as a result of the visits to the dentist, and a direct result of dental inspection.

This campaign for a clean mouth increases a desire for cleanliness in every way and materially increases the vigor and working efficiency of the pupils in our public schools. Then every father, mother and teacher must unite with the great forces now at work to secure conditions which will prove a health protection to our boys and girls and produce men and women, our future citizens, strong both in body and mind.

"(Signed) ALBERTA STROME,
"*Teacher in the Tappan School, Ann Arbor.*"

"The immense improvement in the state of the teeth which is evident throughout our entire school may be, without a doubt, attributed to the introduction of dental inspection. I am heartily in favor of the work.

"(Signed) EMMA WEITBRECHT,
"*Principal of Mack School, Ann Arbor, Mich.*"

## THE TENTH ANNUAL DINNER OF THE ST. LOUIS SOCIETY OF DENTAL SCIENCE*.

After the members and their guests gathered and held their annual reunion of good fellowship, they were served with a delightful repast, with plenty good wine to clear the throat and brain.

In the pleasant frame of mind which seemed to be most perfectly created about the festive board, everyone joined heart and soul in the entertainment that followed.

The Committee had arranged a program of music, toasts and readings which furnished a delightful entertainment.

The toasts, which are herewith attached, were enjoyed to the fullest extent, as were also the delightful music, which was furnished by Mrs. Val H. Fredericks and Master William Henry Arthur, and the reading by Mrs. Edward E. Haverstick.

The Committee, however, felt somewhat despondent at the close of the evening for fear they would not be able to furnish as good a program next year.

The following is the program:

### TOASTS

*Toastmaster*, - - - - - - - - - DR. J. P. MARSHALL.

"Friendship shall still thy evening feast adorn,
And blooming peace shall ever bless thy morn."—*Pope*

*Ladies, Guests and Fellow Members of this Society:*

As I sat here this evening enjoying to the utmost this tenth annual family reunion of the St. Louis Society of Dental Science, for it is in reality a family gathering and a reunion, for year after year as we meet here on these occasions it is the same coterie of earnest, faithful workers and their equally faithful and generous wives. For, are they not faithful and generous in permitting us to use their latchkey on every meet-night and letting us off without a murmur as to time wasted or a word of reproach about thinking more of the Society than we do of them?

Here this evening with our beloved wives, the situation reminds me somewhat of that delightful little poem of James Whitcomb Riley's, entitled "That Old Sweetheart of Mine." The last lines, if I recall, are like this: "Yet with eagerness and rapture, all my visions I resign to see the living presence of that old sweetheart of mine. But, Ah! my dream is broken by a step upon the stair, and the door is softly opened and—my wife is standing there." So our wives are with us tonight, and I trust that our sweethearts also, they being one and inseparable.

Methuselah, or some modern muck-raker, once said: "I counsel, introduce not female contemporaries one to another, verily keep thy loves apart, for their wrath kindleth and bitter words when thy doings are made known." But, of course, such advice is superfluous when members of our profession are concerned. I believe it was Methuselah who once said, and it seems that he ought to know, "To a woman all women are enemies, yet men are allies one to another." And David Garrick once said, "Their cause I plead, plead in heart and mind, a fellow feeling makes one wondrous kind."

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*Held in Hotel Jefferson, January 13, 1913.

So, as I see the first toast on the program tonight, "The Boys," I feel wondrous kind toward all the boys, be they young or old, the world over. And I take a great deal of pleasure in introducing that distinguished Hebrew impersonator and royal good fellow, Dr. Edward A. Woelk, of Belleville.

*The Boys,* - - - - - - - - DR. EDWARD A. WOELK

"If you have not enjoyed what youth could give,
But life sunk through you like a leaky sieve,
Accuse yourself; you lived not while you might."

Dr. E. A. Woelk, responding to the toast "The Boys," spoke as follows:

"Sometimes it is our privilege to rest from the every-day activities of our lives and spend an hour in pleasant intercourse with friends who gather round the festive board, when inspired by feelings of gladness and good fellowship, we listen intently, as each does his part toward making the occasion one to be numbered among our treasured memories. Days change to months, and months to years, and we add to the lessons we learned at school, those which the world teaches us. The lapse of time passes unnoticed as the many cares of a busy world keep hand and mind occupied.

"A wrinkle comes, and another to keep it company; a gray hair, and then some more. What! am I speaking of gray hair? Why, we are but boys. I see us now gathering in classes, and at clinics, learning from books which others have learned before.

" 'Tis but a dream that we have entered upon broader fields, each walking along a separate by-way and meeting only now and then, when our little road crosses the highway which leads to the Jefferson Hotel.

" 'Tis but a dream that another generation is occupying our places in the roll call of the classes. Can it be that some of the beloved and respected instructors have taught their last lessons and gone into the Great Beyond to receive their reward?

"In dreams we see them as of old, but in reality the influence of their noble devotion and successful instructions keep alive their memory and leads the boys to follow their guidance. Yes, we are boys, and have gathered tonight to enjoy the passing hour and learn another lesson. So, turn the hands of the dial backward and let us for a moment forget the flight of time. In the words of Oliver Wendell Holmes:

" 'We're boys—always playing with tongue or with pen;
And I sometime have asked: Shall we ever be men!
Shall we always be youthful, and laughing and gay,
Till the last dear companion drops smiling away!

Then here's to our boyhood, its gold and its gray!
The stars of its winter, the dews of its May!
And when we have done with our life-lasting toys,
Dear Father, take care of Thy children—The Boys!' "

Toastmaster: Upon the honorary roll of this Society, and I wish to say that the honorary roll is very limited, are the names of men who have attained great prominence in scientific pursuits and in various professions, and they received just rewards for their tireless efforts for the betterment of the human race and the advancement of civilization by being placed in posts of high preferment. But, of the entire number, I know of none with a keener intellect, a finer perception or a more infinite regard for the eternal fitness of things the best, than the gentleman whom I shall now introduce to you. I take an unusual pleasure in introducing Dr. R. C. Blackmer, who will speak to the toast "Rest":

*"Rest,"* - - - - - - - - - DR. R. C. BLACKMER

"What so strong,
But, wanting rest, will also want of might!
The sun, that measures Heaven all day long,
At night doth bait his steeds the ocean waves among."
—*Spencer.*

### REST

Ladies and Gentlemen: It is with unfeigned pleasure that I rise to return my thanks for this your second invitation to be with you on the occasion of your annual meeting and banquet and to enjoy with you this feast of the renewal of friendship and professional fraternity. I have already tasted your salt and found it savory. I have drank your wine and found it sweet. I have eaten of your bread and been nourished and strengthened by it. We have dipped our hands together in the same dish and you have not betrayed me and again tonight I have enjoyed your little entertainment and am glad to be with you.

Last year it was my lot to talk to you a little while on the subject of “Life.” Tonight I find your toastmaster has assigned me the subject “Rest.” It seems to me that there is no word in the English language that, in itself, tells so many lies as does this little word of four letters. For instance, a friend of mine once went up into the White Mountains of New Hampshire to get a little “rest” and “change.” He afterwards told me that the bell boy got the “change” and that the landlord got the “rest.”

The word “Rest” is derived, by a process of contraction, from the word “Restore,” which is compounded of two Latin roots “re” and “sta,” which collectively mean to keep right on hustling. Even in its old Teutonic form, “Rest” meant to pause and change direction. It also means to refill, to rebuild, to regain that which has been wasted or lost.

The philosophy of “Rest” has been but little studied in this land of ours. It has always been considered a suspicious character on which no one ever had any good to say. Its entire theory and condition has never been the object of praise. We are eternally exhorting those around us to zeal, to activity, to energy, and this last always of the dynamic and never of the latent variety. Every teacher urges her pupils to industry and tells them stories of the Little Busy Bee and the Early Bird that catches the worm, for examples. Every employer and boss measures his entire skill and usefulness on his ability to keep those under him forever on the jump. All our philosophers recommend perseverance along some single direction and to keep the point aimed at continually narrowing. Specialize, specialize, they say. They declare that there is always room at the top. They tell us that the man who can preach the best sermon, can build the best house, can write the best poem, can paint the best picture or even make the best basket, may pitch his tent in the midst of the Amazonian forests and that the world will build a boulevard up to his door.

The German proverb says, “Without haste, without rest, Bind this motto to thy breast. Bear it with thee as a spell, Through storm and sunshine guard it well. Heed not flowers that round thee bloom, Bear it onward to the tomb.”

In the ardor of this philosophy the mountains are pulled down, the valleys are filled up, the roads made fair and flat, the pot kept forever boiling, the scum rising to the top and the dregs burning on the bottom. The farmer toils and moils without ceasing to raise more corn to feed more cattle, to buy more land, to raise more corn to feed more cattle to buy more land, and so on to the end of life. And even on the coffin lid the word lies, for the liberated soul immediately takes on a new series of activities in a different sphere and the body immediately begins a process of changes that will ultimately reduce it to its original elements, and these elements are no sooner free than they seek another life 'round which to attach themselves.

The moon rushes in its orbit around the earth, the earth around the sun, the sun around some greater center, and so on ad infinitum. I suppose if some Reformer should take it into his head to organize a society to be forever known as the Hibernating Order of the Sons of Rest, every member would at once begin working his head off to get himself elected Grand Snorer, and no sooner would that be accomplished than he would exhort them to hustle and build up the order.

In our system of economy there is no room or provision for one of the strongest desires of our nature. Those of you who have read Sir Gilbert Parker's book called “The Right of Way,” will remember how Charley Steele, in the hour of his desperation, was moved by the old missionary hymn, “There Is Rest for the Weary.” The hope of that hymn is vain. There may be change for the weary, but rest—never.

Once launched on life's broad ocean, thenceforward all is turmoil from the cradle to the grave. Even the joyous child basking in affection's sun finds its careless hours beguiled with some new hope or beauty. The gladsome youth feels his ardent heart deep filled with young ambition's fires and ever mounting to some new achievement, and when we mark man's loftier estate and see through what immensity of danger, toil and strife he struggles on to reach some longed-for though imaginary goal, how proud aspiration and never-ending hope lures his restless spirit until exhausted nature sinks and his tired body finds repose—not rest—beneath its kindred earth, we must needs realize the lie the word forever tells. If this is true of work, so also is it true of pleasure. The rule holds good here as elsewhere. “Behold the child by Nature's kindly law, Pleased with a rattle, tickled with a straw; A livelier plaything is the youth's delight, A little louder, but as empty quite. Scarfs, garters, gold amuse his riper stage, And beads and prayer-books are the toys of age. Pleased with each bauble as the one before, Till, tired, he sleeps, and life's poor play is o'er.”

I heard of one old farmer, prosperous, hale and hearty, his children all doing well for themselves, everything around him in comfort. A friend said to him, “You have everything the heart could desire, why don't you rest? He replied, “I would like to own the land joining me.” His only desire at that time was the earth and the fullness thereof. And so we keep surging to and fro in the restlessness of avarice and the thirst for delight, sometimes driven by the fear of poverty, sometimes lured by the hope of fame. Even King Solomon, with seven hundred wives and three hundred concubines, with gold like the stones in the street, with horses and chariots and soldiers and servants in abundance, accomplished in learning, respected by his neighbors, loved by his people, and, best of all, in good health, pronounced the whole thing vanity and vexation of spirit.

This reminds me, that smart as we think ourselves, our Oriental brethren discovered our need long before we did, and the hopelessness of it also. The Lord and Prince Siddartha was horrorstruck to find humanity and all other life as well bound to such a wheel of energy and change, and he left his royal home to seek a way in which mankind might be delivered from its thrall, and on the night of his great trial under the Bo tree, when legions of hell withdrew and he became Samma Sambuddah, and his eyes were opened to the past and he saw the trail of lives over which he had come, five hundred lives and fifty, and saw how in each the new life did reap what the old life did sow, the good producing good and the evil producing evil by sure arithmetic. He saw how rest could never be procured by trying to satisfy desire, the desire growing with that on which it fed. Neither could rest be attained by reducing desire to the vanishing point, for aceticism gained no more than indulgence, even though it seem more dignified, that rest in Nirvana only came, as did the Kingdom of Heaven, spoken of by Jesus Christ, through the ecstacy of a great love.

Ah! my friends, the rest we really need is that implied in the true meaning of the word and easy to secure, not stagnation, but change in thought, diversity in action, enlargement of view, the satisfaction that comes with a great love, in which he that loseth his life shall find it. Draw tight the cords that bind humanity together and let the great wheel of energy roll on. It can't travel too rapidly for us. Some of it we realize right here in such gatherings as this.

I am told that there is a garden in the distant city of Fez, where white-garmented Moors come and sit in the cool of the evening and listen to ancient stories that they know by heart and the tender thrum of music that was old when the pyramids were new, and watch a dancing girl or two as they flit, with soft feet, behind the smoke of their Narghiles. Around the garden are innumerable scalloped arches, on the tops of which walls beyond walls extend far into the city, and they gleam in the pale moonlight, now a faint yellow, and now not yellow but white, and anon not white but rose. In the center of the garden is a pool of water that looks blue from the intense color of the sky save where its surface ripples with a silver sheen under the trembling light reflected from the walls. Near the pool stands a mighty vase filled with scarlet flowers, the names of which I have forgotten, and around the vase are spread deep-tinted rugs of intricate pattern that cool the sun-heated pavements, and I am told that as the dancers flit and the story droons along and the water trickles over its stone basin and the odor of the flowers scents the lambient air, that the music steals away the fierceness of each troubled heart, and when at last the Muezzin chants the call to evening prayer, the benediction of God soothes into sweet oblivion the toil and warfare that had infested the day, and they wander home at peace with all the world.

So you have come here year after year and listened to ancient stories and a little music, also old I hope, and clasp each other's hands in friendship, spend a quiet evening and lay aside the cares that infest the day in "Rest."

*Reading,* - - - - - - - - Mrs. Edward E. Haverstick

> "He who interprets literature must interpret life—life relieved of the incidents of the commonplace, conceived in simplicity, made incarnate through the magic of speech."

*Music,* - - - - - - - - - - Mrs. Val H. Fredericks

"Music! Oh, how faint, how weak,
Language fails before thy spell!
Why should feeling ever speak
When thou can'st breathe her soul so well?"
—*Moore.*

*Music,* - - - - - - - - - - - - Dr. E. J. Lenzen

"Music, which gentler on the spirit lies
Than tired eyelids upon tired eyes."
—*Tennyson.*

Toastmaster: Of all the people of my acquaintance, I know of none with ability to handle the English tongue in so varied and interesting a manner as is the gentleman I am about to present to you. In fact, this ability is so marked that at times he reminds me of a little incident which I heard Dr. Kirk relate down at Washington last summer. It was of an old colored preacher who invited his congregation to the coming Sunday sermon, upon which occasion the old preacher proposed to give a discourse in which he would attempt to explain the unexplainable, define the undefinable, and unscrew the inscrutable.

Now, if there is anyone who can take such liberties with the English language and get away with it, it is this gentleman, and I take great pleasure in introducing to you the Honorable J. Nick Perrin, who will respond to the toast "Woman."

*Woman,* - - - - - - - - - HON. J. NICK PERRIN

"If the heart of a man is depress'd with cares,
The mist is dispell'd when a woman appears."
—*Gay.*

Responding to the toast "Woman," the Hon. J. Nick Perrin spoke as follows:

### WOMAN

Eden's famous garden, rich in beauty and in fragrance; with its trees, divinely planted by the Master; with its beauteous shrubs and flowers; with its fragrant buds and blossoms and a glossy, silvery river running through its landscape, was a bleak and dreary desert, with no welcome oasis whose life-refreshing sight could cheer and comfort Adam. While the sun was shining in the noon-day heavens, all was black as night around him. While the larks were gaily singing in the meadows, he could only hear the owlets screech in lonely caverns. "And the Lord said, 'It is not good that man should be alone.'" Then came the last great crowning act of creation. Adam slept. A deep sleep. A rib was taken from him. A spare rib it must have been or else he couldn't have gotten along without it. The flesh was closed up. The wound was healed. The last act of creation was done. Adam awoke and responded to the subject of our toast, "Woman." Then he saw the sun at midnight. Through the gloomy clouds the stars were brightly beaming. In every tree he heard a feathery songster. No more darkness. No more owlets screech in lonely caverns. All was light. He heard the grand orchestra of heaven turned loose and he kept time and patted his foot to the music of the angels. The wedding bells were ringing and the pair was as completely happy as if in attendance upon a banquet of the St. Louis Society of Dental Science.

The experience and history of the human race have proceeded on similar lines ever since. And without the subject of our toast, the history of this world would have been a prosy book, with every leaf a simple fly-leaf. But, as it is, those pages are illumined by the brightest rays heroic and immortal deeds can shed upon them. True, that now and then you find a toad among the lilies; and thus sometimes is found a page whose legend tells a hideous tale, revolting to the reader, in the midst of many other pages written full of pleasing stories. Thus you find the history. But the pleasing pages hide the gloomy as the toad is hidden by the lilies. Yes, we read of female monsters, but forget their fearful horrors when we read of graceful nymphs and sylvan beauties. Homer speaks of false, unfaithful Clytemnestra, but he also tells the story of the chaste Penelope and the beauteous Helen. History speaks of cruel Catherines, but their dreadful deeds are lost among the many deeds of kindness done by noble women on the gilded throne and in the lowly cottage. These are the deeds that give a lustre to our history that never would have shone and brightened had not God created woman.

Believe me, it was a good thing all around that woman was created. She has furnished a subject for the artist and enabled Raphael to paint his Madonnas. She has given the sculptor a model and enabled Cleomene to chisel from the inanimate marble his lifelike Venus of Medicis. She has inspired the author and enabled Shakespeare to create a Juliet for his Romeo. She has fascinated rulers, for Caesar and Marc Antony were willing to mortgage Rome, and their chances for heaven thrown in, for Cleopatra. She has swayed the scepter over kings, as Madame de Maintenon did over Louis XIV. She has captivated many a statesman and sailor; lawyer and litigant; preacher and parishioner; and now and then even, though rarely, a susceptible dentist.

Without question, the campfires on the mountains of our lives would be but dimly burning if we did not have the womanly smiles of our chaste Penelopes and our beauteous Helens to light them into cheerful blazes. Yes, we need those womanly smiles and we need the woman. Need her moral influence, need her virtuous presence, need her gentle graces and refining power.

Then, let us drink this toast to her — the guardian of our fireside, who watches home and all its precious interests, and with anxious care attends to all its wants — the real, the true, the noble woman.

## A BUSINESS SUGGESTION

Many dentists seem not to realize that traveling representatives of manufacturers and dealers leave their homes, undergo all sorts of hardships and inconveniences, wear out their lives and spend an immense amount of their employers' money for the one purpose of saving trouble, time and money for the dentists visited.

Suppose that the time should come, as the constantly increasing expense of doing business and the consequent great reduction in profits seem to indicate that it may come, when it became absolutely necessary to change the method of doing business by the withdrawal of all travelers, leaving dentists living remote from the source of supplies to their own resources; suppose that such dentists were obliged to plan far in advance of their needs and send all of their orders by mail; just suppose such a state of affairs, with all its inconveniences and annoyances, and compare it with the ease and convenience of present methods, and decide which you would prefer.

If dentists will but think a moment, it seems that they should realize that they owe some little consideration to manufacturers and dealers who send their representatives to call upon them, at least enough to do a little planning in advance of their periodical visits, with the idea of saving delay on the part of the traveler.

Every fraction of an hour lost by a traveling man means actual money lost and discouragement and consequent loss of efficiency. Every time a traveler breathes some fraction of a dollar has been added to his expense account, that must be paid by somebody; every hour of time lost reacts in discouragement upon both the traveler and his house.

Business men realize these things and arrange their time in advance so as to see travelers as promptly as possible. Even a few moments' delay may spoil the plans of the traveler for an entire day. Is it asking too much to suggest that dentists do likewise? Try to put yourself in the place of the salesman and his house and ask yourself how you would like to be pulled out of bed at 3 A. M. in order to "make a town," and then be compelled to cool your heels in a sample room for an hour or two awaiting the convenience of your customers, particularly if you knew that the total of your sales for that day could not possibly afford profit enough to pay your salary and railway and hotel bills.

Most dentists can so arrange their time as to see salesmen promptly; and it would seem to be no more than common business courtesy for them to do it.

**Tears over yesterday's broken toys blind us to today's treasures.**
—Henry F. Cope.

# EDITORIAL

## THE SUSSEX JAW

Some time ago we called attention editorially to the unearthing of a jawbone near Heidelberg, at a depth of about eighty feet, in a stratum belonging to the lower quaternary, if not to a layer between this and the pliocene. This jawbone has been regarded as that of the oldest known man, perhaps even of a precursor of man.

Up to that time all fossil human bones that had been found, either in Europe or in other parts of the world, did not date beyond the middle of the so-called quaternary period of geological time. No authentic human bone is known to have been found in the earlier quaternary, whence there have been recovered only certain utensils. As for tertiary man, there is no certain proof of his existence, either from implements or from bones. The so-called ''Neanderthal'' skulls and skeletons found in the basin of the Dordogne, of which so much has been said in recent times, date only from the middle quaternary. During the past year there have been found, in Sussex, England, fossil remains of an ancient man or ape-man. These remains were found at a depth indicating a period very near if not in the pliocene age. They are considered fully as old as the celebrated Heidelberg jaw, if not of a still more primitive character.

This recent discovery is characterized by W. P. Pycraft, in *The Illustrated London News* (Dec. 28), as ''of supreme importance to all who are interested in the history of the human race.'' Mr. Pycraft says that what has been found leaves no possible doubt that the living being of whom they once formed a part was a man having a close relationship with his ancestors, the apes. Mr. Pycraft goes on to say:

> ''The evidence for the interpretation which has been placed on them is incontrovertible. In the first place, the lower jaw is unmistakably ape-like, while presenting other features indubitably human. It is ape-like in its massiveness, in the absence of a chin, and in the absence of a peculiar ridge along the inner surface which in the typical human jaw is extremely well marked, and serves for the attachment of muscles concerned with the act of swallowing. Another simian feature is the shortness and great breadth of the upper branch whereby the jaw is hinged to the skull. As to the teeth of this ancient Briton, it will suffice to remark that they resemble those of the celebrated Heidelberg jaw, and in so far are of the human type; but they are ape-like in the greater length of their grinding surfaces. But there is reason to suspect that the canine or 'eye' teeth projected, at any rate slightly, above the level of the rest—an ape-like character

met with in savage races today, though never to the same extent as in apes.

"Another ape-like character is afforded by the trend of the grinders, which shows that the teeth in the complete jaw must have run in a straight, parallel series, not in a horseshoe curve, as in modern men.

"Happily, enough of the skull has been found to allow of the restoration of the whole of the cranial portion, which encloses the brain. And this shows us that the beetling brows so excessively developed in the celebrated fossil man of Java, discovered some years ago, were in the Sussex man far less developed; while the brain capacity of this ancient man had just under two pints, which is nearly twice as much as that of the highest apes, though considerably less than that of the average European, which is, roughly, about two pints and a half."

The circumstances of the discovery are given in some detail in the London *Sphere* (December 28). It was made by Mr. Charles Dawson, who in company with Dr. Smith-Woodward, described the skull and its meaning to a meeting of the Geological Society on December 18. We read:

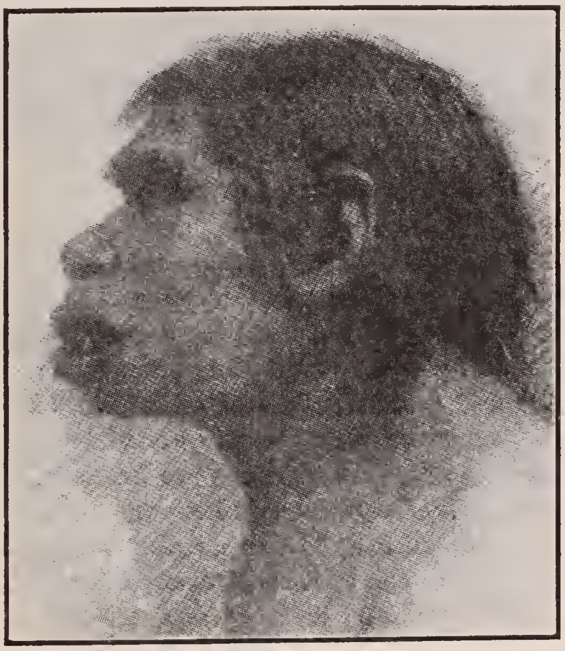

Fig. 1

AKIN TO THE APE

The earliest known inhabitant of England, the man of Sussex, reconstructed by Mr. A. Forestier, artist of *The Illustrated London News*, aided by Dr. A. Smith Woodward.

"Mr. Dawson described the circumstances of the discovery. Water filled the gravel-pit until the end of May, but excavation was begun early in June, and by the end of September had resulted in the finding of sufficient fragments of the skull to restore the whole and also in the recovery of half the lower jaw. At the same time the diggings revealed fragments of two primitive elephants, a hippopotamus, the common red deer and horse, and a beaver. Numerous flint implements of a very primitive type were also found. While the diggings were in progress he examined thoroughly the geology of the whole neighborhood and came to the conclusion that the position of the gravel and its nature proved great antiquity. Since the gravel was deposited the Ouse itself has cut down its channel to a depth of eighty feet.

"Dr. Woodward continued the narrative. With the aid of Mr. Frank O. Barlow, the preparator in the department of geology in the Natural

History Museum, a restored model of the skull was prepared, and it is now possible to study its features accurately and in detail. The only external appearance of antiquity was found in the occiput, which showed that in this early form the neck was shaped not like that of a modern man, but more like that of an ape. The brain capacity was only about two-thirds of that of an ordinary modern man. Two of the molar teeth were human in shape.

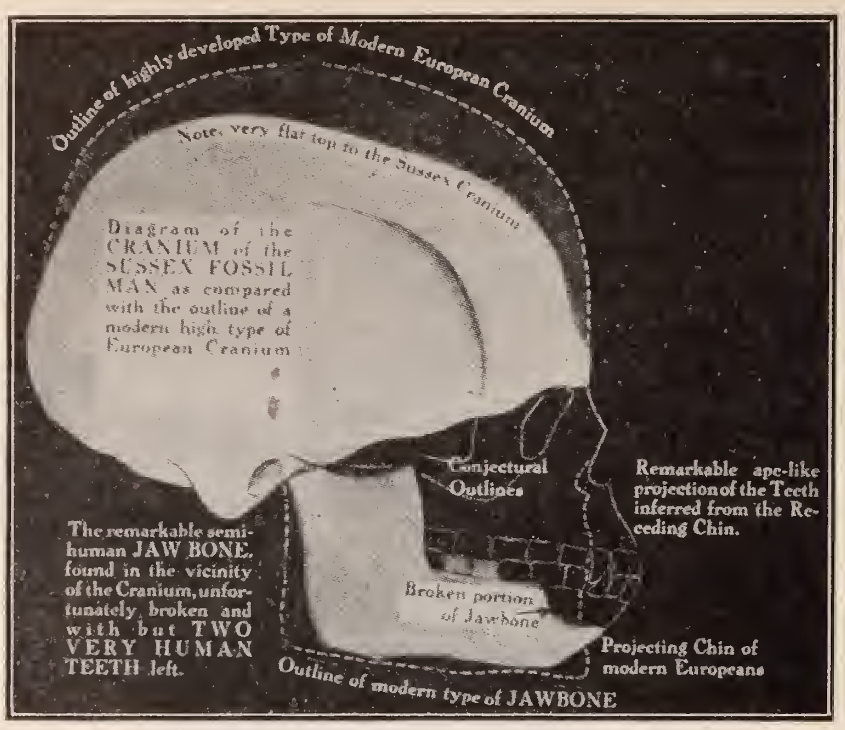
Outline of highly developed Type of Modern European Cranium
Note, very flat top to the Sussex Cranium
Diagram of the CRANIUM of the SUSSEX FOSSIL MAN as compared with the outline of a modern high type of European Cranium
Conjectural Outlines
Remarkable ape-like projection of the Teeth inferred from the Receding Chin.
The remarkable semi-human JAW BONE, found in the vicinity of the Cranium, unfortunately broken and with but TWO VERY HUMAN TEETH left.
Broken portion of Jawbone
Projecting Chin of modern Europeans
Outline of modern type of JAWBONE

Fig. 2

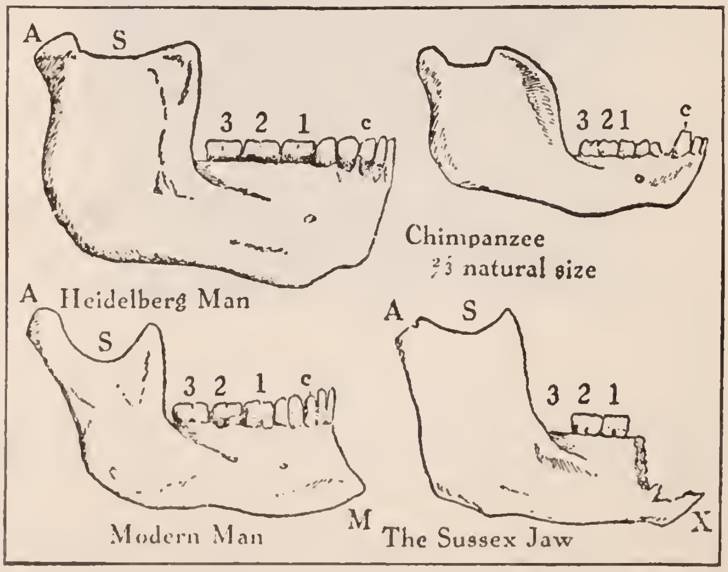

Fig. 3

A COMPARISON OF JAWS.

The Piltdown or Sussex jaw compared with other typical jaws. Four sketches by Sir Ray Lankester, reproduced from the London *Daily Telegraph*. A. Articular process or condyle. S. Sigmoid notch. M. The bony chin. X. Doubtful part of the Sussex jaw; compare with the chimpanzee and with the modern man. c. Canine tooth. 1, 2, 3. First, second and third molar teeth—between these and the canine are the two "bicuspids" or "premolars," while in front of the canine are two "incisors" or front teeth.

"As to his personal appearance one would not like to dogmatize, but, with the help of Mr. Forestier, I have been enabled to make what is probably a near approximation to the truth. (See Fig. 1.) He was a man of low stature, very muscular, and had not yet attained that graceful poise of the body which is so characteristic of the human race today. But he was by no means lacking in intelligence. Living in a genial climate amid a luxurious vegetation, and surrounded by an abundance of game, he may be said to have led a life of comparative ease. Of clothing he had no need; nor was there any reason to bother about much housing accommodation; though, for safety's sake, he may have been forced to devise some kind of shelter by night. Elephants and rhinoceroses of species long since extinct roamed in herds all round him. These and the hippopotamus no doubt he killed for food, and, besides, he must have hunted a species of horse long since extinct, while the lion, bear, and saber-toothed tiger afforded him plenty of opportunities for hairbreadth escapes. He had probably inherited the use of fire from his forbears, and this useful ally served to harden the ends of his wooden spears, and perhaps to cook his food. His only other tools were furnished by flint stones chipped to the rough semblance of an axe, but used in the hand, not wielded by a shaft. From the peculiar character in which it was flaked from the rough nodule selected, this implement is known as of the 'Chellean' type, and though one of the more primitive types of Paleolithic weapons, it showed better workmanship than is displayed by the still earlier 'Strepyan' and 'Mesvinian' types, and a great advance on the much-discust 'eoliths.' These earlier weapons, it may be remarked, are the only evidence we have of the existence of men older than the makers of 'Chellean' implements, but they speak as surely as did the footprints found by Robinson Crusoe.

"Finally, these fragments of man from the Sussex gravel tell us that already at this early period the human race had begun to split up into different peoples, which had spread far over the earth's surface, as is witnessed by the remains found in Java and at Heidelberg. And these three, we must point out, belong, roughly, to the same period of time in the world's history; these three, more than any others, bear witness to man's kinship with the apes."

A comparison of the jaws is interesting and is here illustrated. (Figs. 2-3.)

# SOCIETY ANNOUNCEMENTS

## Pennsylvania State Board of Dental Examiners

The next regular examination of the Pennsylvania State Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday and Saturday, June 11, 12, 13 and 14, 1913. Application blanks can be secured from the Department of Public Instruction, Harrisburg. Further information can be secured from ALEXANDER H. REYNOLDS, *Sec'y.*,
4630 Chester Ave., Philadelphia.

## Wisconsin State Board of Dental Examiners

The Wisconsin State Board of Dental Examiners will convene in Milwaukee, at Marquette University, on June 16th, at 2 P. M., for examination of applicants to practice in Wisconsin. High School diploma, application and fee of $25.00 must be filed with the secretary fifteen days prior to above date. Dental diploma to be presented in advance of examination.

F. A. TATE, *Pres.*
W. T. HARDY, *Sec'y.*,
422 Jefferson St., Milwaukee, Wis.

## North Carolina State Board of Dental Examiners

The next regular meeting of the North Carolina State Board of Dental Examiners will be held in Winston-Salem, N. C., beginning promptly at 9 o'clock on Monday morning, May 26th. For further necessary information address the secretary.

Dr. F. L. Hunt, *Sec'y.*,
Asheville, N. C.

## Illinois State Board of Dental Examiners

The semi-annual meeting of the Illinois State Board of Dental Examiners, for the examination of applicants for a license to practice dentistry in the State of Illinois, will be held at the Chicago College of Dental Surgery, corner So. Wood and W. Harrison streets, Chicago, beginning Wednesday, June 4th, 1913, at 9 A. M.

All applications, together with the fees, twenty-six dollars ($26.00), must be filed with the secretary at least five (5) days prior to date of examination. Address all communications to

T. A. Broadbent, *Sec'y.*,
705 Venetian Bldg., Chicago, Ill.

## West Virginia State Board of Dental Examiners

The next annual meeting of the West Virginia State Board of Dental Examiners, for the examination of applicants for a license to practice dentistry in the State of West Virginia, will be held in Huntington, beginning Wednesday, June 11, 1913, at 9:00 A. M. All applications, together with the fees, twenty-five dollars ($25.00), must be in the hands of the secretary at least one week prior to the date of examination.

Address all communications to

L. Geo. Beerbower, *Sec'y.*,
Beerbower-Zeller Bldg., Terra Alta, W. Va.

## 45th Annual Meeting, Albany, N. Y., May 8, 9 and 10, 1913

The Dental Society of the State of New York will hold the forty-fifth annual meeting on the above dates. The business portion of the program is to be given at the Educational Building.

The headquarters of the Society and the exhibits, together with the clinics, will be at the Ten Eyck Hotel.

The dining room and ballroom have been secured. Clinics and exhibits to be in both rooms. The clinics are to be held on both Friday and Saturday mornings.

A special effort is being made to secure a larger number of exhibitors than heretofore, as we have more space, and exhibitors will have more time to see and talk to dentists.

Address all communications to

O. J. Gross,
4 South Church St., Schenectady, N. Y.

## An Important Meeting

The annual meeting of the National Dental Protective Association will be held at the Fredonia Hotel, Washington, D. C., May 20, 1913, at 7:30 P. M., for the election of trustees and transaction of business.

E. P. Dameron, *Pres.*
M. F. Finley, *Sec'y.*.
1928 Eye St., N. W.

## South Carolina State Association

The forty-third annual meeting of the South Carolina State Dental Association will be held on The Isle of Palms, June 25, 26 and 27, 1913.

W. Busey Simmons, *Sec'y.*,
Piedmont, S. C.

## Meeting of the Colorado State Dental Association

The twenty-seventh annual meeting of the Colorado State Dental Association will be held at Manitou, Colorado, June 19-20-21, 1913. The clinics will be in charge of Dr. A. W. Starbuck, 1340 Arapahoe st., Denver, Colo., who will furnish any information relative to same. Exhibitors desiring space will please address Dr. F. P. Wells, Exchange National Bank Bldg., Colorado Springs, Col.

All ethical members of the profession are cordially invited to attend the meeting. Any other information will be cheerfully furnished by the secretary.

H. W. LeFevre, *Pres.*,
206 Metropolitan Bldg., Denver, Colo.
C. A. Monroe, *Sec'y.*,
302 Mercantile Bank Bldg., Boulder, Colo.

## Fiftieth Anniversary Susquehanna Dental Association

The fiftieth anniversary meeting of the Susquehanna Dental Association of Pennsylvania will be held at Irem Temple, Wilkesbarre, Pa., Tuesday, Wednesday and Thursday, May 20, 21 and 22, 1913. All ethical practitioners are invited.

The Executive Committee is made up as follows: Doctors A. E. Bull, T. W. Thomas, W. E. Davis, B. A. Courtright, A. J. Heffernan, Wilkesbarre; A. B. Miller, Kingston, and I. H. Jennings of Danville.

Edmond J. Donnegan, *Rec. Sec.*

## The Mississippi Dental Association

The thirty-eighth annual session of the Mississippi Dental Association will be held at Meridian, June 24, 25 and 26, 1913. A fine program is promised and an invitation is extended to all ethical practitioners to meet with us.

Dr. L. B. Price, *Sec'y.*,
Corinth, Miss.

## Indiana State Dental Association

The fifty-fifth annual session of the Indiana State Dental Association will be held in the Claypool Hotel, Indianapolis, May 20-21-22, 1913.

The officers of the association recently met at Indianapolis and perfected plans for a three-days' "Post Graduate Course." The very best instructors and specialists are being secured for each day.

The course will be as follows: Tuesday, "Humanitarian Dentistry"; Wednesday, "Preventive Dentistry"; Thursday A. M., "Prosthodontia"; Thursday P. M. a great table clinic. The clinic will be held in the hotel.

No tuition fee for the members of the association or visitors from outside the State who are in good standing in their State Association, but all others desiring to take this course must arrange their tuition fee with the secretary.

Otto U. King, *Sec'y.*
Huntington, Ind.

## The Northern Ohio

The fifty-sixth annual meeting of the Northern Ohio Dental Association will be held at Cleveland, June 5, 6 and 7.

## Meeting of the Texas State Dental Association

The thirty-third annual meeting of the Texas State Dental Association will be held at Temple, Texas, May 15, 16 and 17, 1913. The clinics will be in charge of Dr. J. O. Hall, Waco, Texas, who will furnish any information relative to same. Exhibitors desiring space will please address Dr. J. M. Murphy, Temple, Texas. All ethical members of the profession are cordially invited to attend the meeting. Any other information will be cheerfully furnished by the secretary.

GUY MORGAN, *Pres.*, Paris, Tex.
J. G. FIFE, *Sec'y.*, Dallas, Tex.

## Lake Erie Dental Association

The fiftieth annual meeting of the Lake Erie Dental Association will be held at Hotel Bartlett, Cambridge Springs, Pa., May 15, 16, 17, 1913. This meeting celebrates the Golden Anniversary of this Society, and the Program Committee have arranged for the best meeting ever held.

Entertainment for the ladies. Come and bring them.

C. L. MEAD, *Sec'y.*,
Union City, Pa.

## California State Dental Association

The next annual meeting of the California State Dental Association will be held on June 2, 3, 4 and 5, in the Hotel Oakland, at Oakland, California.

E. E. EVANS, *Sec'y.*

## The Georgia State Society

The forty-fifth annual meeting of the Georgia State Dental Society will convene at Columbus, Ga., June 12, 13 and 14, 1913, beginning Thursday, June 12th, at 11 A. M. Some very interesting lectures and papers will be presented, also an elaborate clinic has been secured.

Further information will be cheerfully furnished upon request from ethical practitioners of other States contemplating a visit to the meeting, to whom a cordial invitation we extend.

M. M. FORBES, *Sec'y.*,
Atlanta, Ga.

## The Odontological Society of Western Pennsylvania

The thirty-second annual Spring meeting of the Odontological Society of Western Pennsylvania will be held at Hotel Henry, Pittsburgh, April 8th and 9th, 1913. Practical papers and instructive clinics will predominate. Ethical practitioners are cordially invited to attend.

KING S. PERRY, *Sec'y.*

## Meeting Cancelled

The Alumni Association of the Washington University Dental School (Missouri Dental College), St. Louis, Mo., has decided to withdraw the annual clinic for 1913, owing to the proximate date of the next session of the National Dental Association at Kansas City, Mo.

R. H. MILLER, D.D.S.,
Chairman Publicity Committee.

### The Tennessee State

The Tennessee State Dental Association will hold its annual meeting in Nashville, on June 5, 6 and 7, with the following officers in the chair: President, F. W. Meacham, Chattanooga; First Vice President, Wm. C. Gillespie, Nashville; Second Vice President, J. L. Manire, Memphis; Recording Secretary, C. Osborn Rhea, Nashville; Treasurer, W. S. Hutchinson, Nashville; Corresponding Secretary, C. E. Hines, Memphis.

Further information may be had by addressing the secretary.

### Southern Branch N. D. A.

The fifteenth annual meeting of the Southern Branch of the National Dental Association will be held at the Chamberlin Hotel, Old Point Comfort, Va., July 22 to 25, inclusive. The Virginia State Dental Society will meet conjointly with the Southern Branch at that time.

THOS. T. MOORE, JR.,
Cor. Sec. Southern Branch of N. D. A.

### The Southern California Dental Association

The sixteenth annual meeting of the Southern California Dental Association will be held in Los Angeles on the 26th, 27th, 28th and the 29th of May, 1913. An excellent program of essays and clinics, as well as a large and elaborate exhibit, is being arranged. All ethical practitioners of dentistry are cordially invited to be present. Further information will be sent upon request. JAMES D. MCCOY, *Chairman Publicity Committee.*

708 W. P. Story Bldg., Los Angeles, California.

### National Dental Association

The 1913 session of the National Dental Association will be held in Kansas City, Mo., July 8th to 11th. The local Committee of Arrangements have selected the Baltimore Hotel as "headquarters" and made the other necessary arrangements for this meeting. The officers and committees are planning to present an exceptionally interesting program, the details of which, together with the other arrangements, will be presented in later journals.

FRANK O. HETRICK, *President,*
Ottawa, Kansas.
HOMER C. BROWN, *Rec. Sec'y.,*
185 E. State St., Columbus, O.

### New Jersey State Dental Society

The forty-third annual convention of the New Jersey State Dental Society will be held in the Beach Auditorium at Asbury Park, N. J., July 16, 17 and 18, 1913, beginning on Wednesday, July 16, at 10 A. M.

The exhibits of modern dental appliances and the latest in office and laboratory equipment will be in charge of Dr. William H. Gelston, 40 N. Thirtieth street, Camden, N. J., who will be glad to furnish information regarding rates and space still available. Early application from those desiring to exhibit with us this year will be greatly appreciated.

The clinics will be in charge of Dr. Henry Fowler, 114 N. Fourth street, Harrison, N. J., and will be comprehensive and of a very high order.

Further announcements will be made from time to time.

47 Crescent Ave., Jersey City, N. J. EDWIN W. HARLAN, D.D.S., *Sec'y.*

## Illinois State Dental Society

The Forty-Ninth Annual Meeting of the Illinois State Dental Society will be held at Peoria, May 13, 14, 15, 16, 1913. Chas. M. Smith, Local Arrangements Committee. Dr. Henry L. Whipple, Secretary, Quincy.

## Meetings of Dental Societies, 1913

The Michigan State Dental Association, at Grand Rapids, April 10-11-12.
The Indiana State Dental Association, at Indianapolis, May 20-21-22.
The Susquehanna Dental Association of Pennsylvania, at Wilkesbarre, May 20-21-22.
The Mississippi Dental Association, at Meridian, June 24-25-26.
The Texas State Dental Association, at Temple, May 15-16-17.
The Louisiana State Association, May 22-23-24.
The Illinois State Association, at Peoria, May 13 to 16.
The Oklahoma State Society, at Oklahoma City, May 8-9-10.
The Lake Erie Dental Association, at Cambridge Springs, Pa., May 15-16-17.
The Kentucky State Dental Association, at Lexington, May 26-27-28.
The Northern Ohio Dental Association, at Cleveland, June 5-6-7.
The Georgia State Dental Society, at Columbus, June 12-13-14.
The Southern Branch National Association, at Chamberlin Hotel, Old Point Comfort, Va., July 22-23-24-25.
The Colorado State Dental Association, Manitou, June 19-20-21.
The South Carolina State Association, Isle of Palms, June 25-26-27.
The Tennessee State Association, Nashville, June 5-6-7.
The Dental Society of the State of New York, Albany, May 8-9-10.
The Upper Peninsular (Mich.) Dental Society, at Houghton, first week in June.
The California State Dental Association, at Oakland, June 2-3-4-5.
The Odontological Society of Western Pennsylvania, at Piitsburgh, April 8-9.
The Odontological Society of Western Pennsylvania, at Pittsburgh, April 8-9.
The National Dental Protective Association, Fredonia Hotel, Washington, D.C., May 20.
The New Jersey State Dental Society, Asbury Park, N. J., July 16-17-18.
The National Dental Association, Kansas City, Mo., July 8 to 11.
The Southern California Dental Association, Los Angeles, May 26-27-28-29.
The Illinois State Dental Society, Peoria, May 13-14-15-16.

---

**Are you worsted in a fight?**
**Laugh it off.**
**Are you cheated of your right?**
**Laugh it off.**
**Don't make tragedy of trifles,**
**Don't shoot butterflies with rifles—**
**Laugh it off.**

**Does your work get into kinks?**
**Laugh it off.**
**Are you near all sorts of brinks?**
**Laugh it off.**
**If it's sanity you're after,**
**There's no recipe like laughter—**
**Laugh it off.**

# THE DENTAL SUMMARY

The Magazine That Helps

Vol. XXXIII MAY, 1913 No. 5

OFFICIAL ORGAN

The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office; 1255 Neil Avenue, Columbus, Ohio
L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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## REGULAR CONTRIBUTIONS

### HEALTH—THE DENTIST'S CARE OF HIMSELF—PHYSICAL TRAINING FOR THE PROFESSIONAL MAN—THE HEALTH OF THE DENTIST FROM THE DENTIST'S STANDPOINT*

BY DAVID INGLIS, M. D., DETROIT, MICH.

WHEN I was a boy in high school, Mr. Chairman, one of my boy friends was a fluent speaker and always at home on his feet. In those days we used to have Lyceum debates. My friend was to take a certain side in a debated question and he came a little late. The preliminary part of the meeting had been gone through with and it was time for the debate to begin. He threw his hat down and rushed onto the platform and sailed in, and began with great fervor to advocate one side of the question. After he got well into it one of the boys pulled him by the coat-tail and whispered, "Stop, you are appointed to debate on the other side." John never turned a hair but he went ahead and finished up what he had in his mind to say. "And now," he said, "gentlemen, I have given you all of the arguments my opponents can bring to you. They have nothing further to show you about this side of the question, and now I will proceed to show you the fallacy of those arguments." He then proceeded to debate on the other side, and then they had nothing further to say.

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*Read before the First Michigan District Dental Society, March 14, 1912.

When I read this program I thought "Here is a chance now, David, for you to sail in and take up all those subjects and leave the other man nothing to say." The reason for that was this—you have, theoretically, divided the subject into three things, and yet the thing is indivisible.

Dr. Carrier, who was known, probably, to most of you here in Detroit as a most lovable man and a most celebrated skin specialist, got up and read a paper before our Society on the diseases of the skin. Now, the skin is on the outside and is not concealed like diseases of the heart and all that sort of thing. You can get at it and treat it from the outside, and one would think that the skin specialist has the easiest job in the world to get at the seat of the disease: it is right there in plain sight for you to get at, and yet, after Dr. Carrier had covered the ground he wound up by this very plain statement, saying, "Any man that wants to be a successful skin specialist must understand the nutritive process of the body as a whole, and understand how to get his patient's whole body in the best possible shape so that the patient's skin may have resisting power to keep itself in good shape." Now there was a skin specialist suggesting that the only one fit to be a skin specialist was a man who regarded the whole body of the patient and not the skin only. You cannot divide these things up. You can make artificial division. Now the subject that comes to me was in regard to the dentist's care of himself, but I could no more write it and leave out the dentist's physical training than I could leave out any other element in the case. However, I will try and keep away from the physical training so as to give the other men something to talk about.

I presume the reason I was called upon to speak to you was in the main because of the fact that the dentist is a nervous sort of chap and leading a very nervous and trying kind of life. I have been pumping some of my confreres here at the table, asking them how they like it, and one of them acknowledged—I won't name him—he is a big man, and said that when, twice a year, I think, he went into a dentist chair to have somebody else give his teeth a little cleaning, the minute any kind of instruments touched his teeth he began to shrink within himself, and I have not any doubt that he did. Another of my confreres here said that whenever he had to deal with a patient who began to shrivel up at the approach of some of those terrible instruments he had a strong inclination to shrivel up himself.

I have not any doubt that it holds true in dentistry, as it does everywhere else, that no man can make a success of the work that he does if he does not bring to it a certain imagination, and no man can be a really good dentist unless he can feel and imagine how the poor victim himself feels. In the first place, as surely as we allow ourselves to imagine the shrinking and the sensitiveness to pain which the victim feels; just so surely that wears upon us.

I always thanked God that I am not a retail druggist, and next to that I thank God that I am not a dentist, because I hate so terribly to have the dentist get at my teeth, or I did when I had them. The fact of the matter is, that from the neurologist's standpoint, I imagine that your profession is one that must necessarily wear a good deal upon the nervous system. Insofar as you are dealing with that phase of life, you must, in the very nature of things, feel some of the pain, some of the agony, which you are compelled to inflict and which the patient is obliged to endure. I would not urge you that you should not urge your imagination, that you should not have feeling, but rather let me put it to you in this way: I think the pictures of Christ, which the artists have portrayed, have always, with singular uniformity, been erroneously portrayed. Christ is always portrayed as a man of sad countenance, rather effeminate, and that is simply on the basis that it is said of Him that He was "a man of sorrows and acquainted with grief." I think they portrayed Christ in a radically wrong way. If I were an artist I would like to portray Him with a face radiant with happiness, as a virile man. I notice that children never climb up on the knees of a sad man, and I notice that live men do not leave their business and follow after a mourner. Christ was a man of sorrows and acquainted with grief, but it seems to me He ought to have a radiant happiness on His face insofar as He realized that it was His province to alleviate sorrow.

We doctors, on my side of the profession, are men of sorrows and acquainted with grief. We are laughing men, and I notice that the men in my profession are a happy lot, inasmuch as we can prevent many things and alleviate human suffering, our sympathies are drawn out to our patients, but I think we should have a right to cultivate a smile. When you, too, realize what a beneficent thing you are doing, how pleasant are the results you are able to bring about, how much better life becomes because of the work you are able to do; it seems to me that that ought to be one remedy for the wear and tear upon our nervous system, and the infliction of pain which certainly does fall to your province. Perhaps you will say, "the doctor is moralizing." Well, we live in this world and get on by moralizing a good deal. But I do want to speak about this, about the physical care of the body of the dentist. I presume some of my fellows will speak about the drawback that the dentist has in the fact that he has to lean over the patient and inhale the breath, and often a variety of breaths, which come his way and the danger of infection and all that. I won't touch upon that, but let me put this thought to you. Any professional man in your profession or with any man whose heart is in his work, he finds this—that by and by his profession comes to absorb more and more of his time. He begins to feel that he is making a success of his profession, and is glad of it, proud of it, and as his income increases, as his reputation increases, he forgets that he is becoming now the slave of his success. I remember one time when I was pretty thoroughly worn out. A friend of my mother's, and old friend of mine, who had known me from babyhood, was consulting me about herself, and she being an old friend, I began to tell her about how very badly I felt, and how utterly worn out I was, and how overworked I was, and she, a wise old English woman, sat there and listened to my talk and said nothing. When I got through she looked at me with a quizzical smile on her face and said, "David, do you know what ails you? The trouble with you is your pride." I was so proud of my success that I was making a fool of myself by letting my profession run away with my whole life, and I have no doubt in the world that this old lady could have said the same thing of some of you gentlemen here who have built up a large and successful practice, and that she could have pointed her finger at you and said, "the only trouble with you is your pride"; you are proud of your success and large practice, and going on wearing your life out and your heart out and making a worse dentist of yourself because you don't take time to do your work as well as you might do it. At least that is what I would say. One of the things that men have to learn when they have to make a success of life is to realize the value of time and to take time. The story goes that a darkey was going up Fifth avenue one day and saw a gentleman coming from one of the brown stone houses. The gentleman ran down the steps as rapidly as he could and a little girl called after him and said, "Papa, papa, you have not kissed me good-bye." He turned around and said, "I can't; I haven't got time." The darkey said that three weeks after that he happened to be strolling by there one day, the same place, and said there was a line of elegant carriages drawn up both sides of Fifth avenue, and right in front of that house was a hearse with nodding plumes and six gentlemen carrying a coffin down the front steps. The darkey said to himself, "The man has not got time now, he has got eternity." That is the trouble with all of you professional men, that you have not got time. We don't take time, some of us, until we have to. In caring for the nervous system, let me tell you what each one of you knows; I am not going to tell you anything you don't know. The man who does not realize that he has got to take time to live while he is carrying on his profession is making one of the most profound mistakes of his life. When a man takes up a policy of life insurance, if he is not altogether a fool, he figures "how long can I be depending on myself to pay the premium, year after year for the fifteen or twenty years." He looks forward with reference to that life insurance to pay fifteen or twenty premiums. I examined a man for life insurance once who had taken out a policy of fifty or sixty thousand dollars. Was that on the basis that he knew he could pay the premium for fifteen or twenty years? No. He had made quite a little fortune in speculation and had got a sum of money that would pay a premium for one year. As to the next year he had not the slightest idea. He was the most idiotic man taking out life insurance that I ever saw, because he did not figure on the paying of those premiums for fifteen or twenty years. When we look into our own lives as professional men we do not sometimes look forward much farther than that. A man says I have got many patients now and I cannot take time. If you lived right, you would figure "what sort of a dentist am I going to be this year, what sort of a practice will I have next year and the next?" You will have children coming along—five, ten, fifteen or twenty years from now—and they will need you. They will need their father fifteen years from now more than they do now. If men would only learn to take time to do a fair piece of work, charge an adequate price for it, collect it, and just take some time so that they could keep themselves acquainted with their family, keeping their bodies in good health, save the wear and tear that the profession certainly means, a good many of us would be in a great deal better shape to be capable and efficient men five, ten and fifteen years from now.

I don't happen to know the men in your profession so well, but I know doctors who go ahead and break themselves down, wreck, smash, and stop simply because they do not realize that they have got to keep on this process for year after year. One of the most beautiful characters in the medical profession that it was ever my good fortune to know, a most lovable man, a capable man, died at forty-two years of age from nothing in the world but working beyond the limit. Had he been willing to take time so that he would be acquainted with his family, had a little of the joy of life, taken care of himself, he could have practiced medicine for fifteen years longer and could have been a beneficence and blessing to mankind for fifteen years, to say nothing of his widow and children. The community suffered a grave loss because the man did not have sense. Now, this may not apply to your practice, but as a nerve specialist I see that it applies to so many men in all applications of life.

In regard to this matter of saving the nervous system, there is this other phase of taking time. Someone has said that a man can do a year's work in eleven months, but he cannot do it in twelve, and there is a profound truth in it. If a man will say, "I will do all my work in eleven months and the other month I am going to take a good, genuine, absolute change of scene, and thought and energy," many a man would save himself in that way. Yet I think that many men make one radical mistake about that. They say this, "I will work like the devil eleven months, and then I am going to take that month, going to New Brunswick or Muskoka, or whatever it is, and that month is going to be a fine thing." That is all right, but the man who is wise will not only plan that month for a real, genuine vacation, but he will plan that he will have a little vacation every day. We hear about the laboring classes and the unreasonable requests that some people say that the laboring men make as to the eight-hour day, fighting for an eight-hour day. The odd part of it is that the professional man hardly ever does his work in an eight-hour day. It is far from me to stand before you as a model, and yet in a certain sense I have been a model in what I am going to say. I reach Detroit at eight o'clock every morning and leave at 4:30 every afternoon, and if Mr. Bryan, who is one whom I highly honor, were to say he would come and see me after half-past four some afternoon I would say, "I am exceedingly sorry, Mr. Bryan, but you will have to wait until tomorrow morning." I work eight hours a day and then I chop it off. Of course, I have reached the time of life when a man can take liberties, but the fact of the matter is that if a man will determine that he will do a certain number of hours' work every day and then stop, he will do himself more good that way than if he would go on a month's vacation.

I presume the dentists are spared the evening and night work that we doctors are called upon to do, and in that sense it may not be necessary for me to urge it upon you, but if you are going to preserve your nervous system, this matter of taking time, so that life shall not be simply the work that you do above the dentist chair, or in your laboratory, you will prolong the period of your efficiency and vastly add to the joy of life. There is another rule for the preservation of our nervous equanimity, and that is that a man shall do one thing at a time, and not think of doing any other thing while he is doing that one thing. Mr. Ledyard carries, I presume, and has for many years carried about as great responsibilities as any man in Detroit, and Mr. Ledyard is a very high-strung, nervous man, as any of you who happen to know him will testify. How has he preserved his ability to go on and go on the way he has? He has done it by a very simple device. He has his private office, and nobody can get at his private office without going through an ante-room, and in that ante-room he has a man who asks the visitors, "What do you want to see Mr. Ledyard about?" and no man can see Mr. Ledyard until he tells the man in the front office what he wants to see Mr. Ledyard about. When you have told the man, and he realizes that you have a proper right to see Mr. Ledyard, you can stay there and kick your heels until your time comes. If Mr. Ledyard happens to be in there with a section hand that he called in off the road to talk about some matter, and the president of the New York Central Lines should happen to drop into the front office, the president of the New York Central Lines could kick his heels until Mr. Ledyard got through with that section hand, and the man in the front office would not be at liberty to tap on the door and say, "Mr. Ledyard, Mr. Vanderbilt is here." He would lose his head if he did. He does one thing at a time and he gets through with the section hand before he will talk to his superior. I don't know how you dentists manage it, but that is an admirable way to do.

I once had under my care the head of one of the big department stores here in Detroit, and when he had perplexed me as much as he could I went over to his place. I said, "Mr. So-and-So, you are the busiest man in the place; you are the worst driven man in the place." I said, "You have not one place in the whole store six feet square that belongs to you." That man went around there like the head of a comet. He had a great many employes, and people were trying to sell him goods and all sorts of things, and following him upstairs and down. He had about a dozen or more on his hands at once. I said to him, "You make a little closet six by eight feet square and put a table in it and have two chairs, and when people call take them in one at a time and shut the door when they are there." I have seen dentists, even in my limited observations, trying to run two or three people in two or three chairs at the same time. I have seen more or less of that. Now, you may keep them pacified for a little while, but I don't believe you will do good dentistry that way. That is not a way of keeping your nervous equilibrium. Finish up one thing and then take another. Don't take your dentistry business home with you. Get your mind off onto something else. When we go out to any insane asylum I think the idea in the mind of most of us is that these asylums are filled up with people who have led vicious lives; I think many people think that the insane asylums are largely populated with victims of alcoholic drink. Oddly, that is not so. I think that some people think that over-study, perhaps, fills the asylums. Overstudy, all alone, by itself, probably sends fewer people to the asylum than any other one thing. If you should go to the asylum you would find that the great bulk of the people there are people whose minds have had the least possible diversity of interest. I suppose farmers' wives constitute the largest bunch of any single class of people there. Did it ever occur to you what the farmer's life up to within the last few years, at any rate, was? The farmer went to town and he sat on the dry goods boxes and talked politics and visited with the other fellows and got some new ideas into his head. The farmer's wife stayed at home, washed, ironed and got the children ready to go to school, cooked, washed, ironed and went through the same grind all the time. She never had the privilege of going to town and sitting on the dry goods boxes. The most she had was to go to church on Sunday; her mind never acquired any mental agility from thinking about various things. What is the matter with the child when it is learning to walk? Give it a little shove and over it goes. It has not learned to balance itself. The mind is just like the legs. The more diversity we give our mind in the things it does and thinks about, the more we cultivate mental celerity, the more difficult it is to upset our balance, and the man or woman who thinks of a very few things is the one who begins to show the signs of lack of mental balance. Even worse than the farmers' wives, especially in the male population of all asylums, you will find a lot of very poorly educated men, men hardly educated at all. I do not know of anything which would prevent the filling of our asylums as well as the training of people in a great diversity of mental occupations. Some of you yourselves may be in this same position tonight, that you don't think of anything else but dentistry, but I would advise you as I would the other professional man, to get away from dentistry at times.

Get some hobby. Most any hobby will do, but have a hobby so that when you get into that you ride that hobby so hard that you cannot think of anything else. Every man chooses his own, but when you ride your hobby, get away from dentistry. I presume that some of you are so glad to get away from your offices that you never go home and tell your wives about the cavities you have seen that day, but any dentist who does go home and tell his wife about the cases he finds in his chair is making a radical mistake. In the first place, I don't think that his wife wants to hear it. I want to say this in regard to the nervous system of the dentist, and that is that the dentist ought to allow himself time to eat and to digest his food. Did it ever occur to you what a dog does when he has had a good meal, if you let him alone? After he eats his meal he gets up, crawls around behind the stove and lies for a little time until his meal starts to digest. I was one time called to a country town to see a banker, and you all probably recognize the fact that in a country town the banker is the most important person in the town. This man was. I was received at the station by a very elegant team, was driven to the house, went up some heavily carpeted stairs; velvet carpet all over the place and you could not hear a single foot-fall. I went into the bedroom where the banker lay in bed. I can be dignified, and at that time I was for a while. The doctor was dignified, the banker was, the banker's wife was, and I was. After I got the story from the banker I said, ''Have you got a cow?'' He answered, ''Yes, I have a cow.'' I said, ''Have you got a hired man?'' I saw a sudden look of indignation on his face at such a fool question, and he said, ''Yes, I have a hired man.'' I said, ''Is your cow worth about $40.00?'' There was an unmistakable look of disapproval on his face. I said, ''Let's talk sense, If you went out to your pasture and found your hired man driving your cow around that pasture lot, and never allowing her any time to lie down to chew her cud, what would you do with your hired man?'' He said as he smiled, ''I would fire him.'' I said, ''Certainly you would. Can't you have sense now about yourself as you have about this $40.00 cow? Now, do you allow yourself time to lie down and chew your cud?'' I had been called to a bad case. He had not treated himself as well as the dog does who curls up behind the stove.

Up in Port Huron I have a reputation as a stomach specialist. I do not deserve it. It came about in this way. A woman up there had a stomach trouble which lasted some time. She had been to several stomach specialists and had her stomach washed out a number of times. She happened to realize after a while that she was intensely nervous and came to a nerve specialist, and that was I. I managed to change her mode of life by a little fatherly advice, which, fortunately, she was willing to follow, and she got better and, to her very great amazement, she got better of her stomach trouble. She went to Port Huron and said the best stomach specialist in Detroit was Dr. Inglis. I am not any stomach specialist at all. The fact was that trouble of hers was nervous dyspepsia. She kept her nervous system keyed up all the while; did not give her stomach time enough to digest food. Yet, she did not have stomach disease at all. As soon as she allowed her nervous system a reasonable amount of quiet, let the nervous force go to the stomach, which must go to the stomach after a meal, let digestion go on, she suddenly discovered that her stomach would digest meats, beef and boiled cabbage. I presume some of you here could tell some little stories about nervous dyspepsia. Any man of you who gets through with a patient at 12 o'clock and goes out and opens the furnace door and shoves in a little fuel, and slams the door shut and goes back to the next patient, is using his nervous power on his patient and has not got power for the purpose of digesting; then comes nervous dyspepsia. It is again but a case of taking time. Don't you see what the value is of taking time? I may tell you the rest about that banker. I had occasion to go to that same town some time afterward and as I went along the street I saw the banker on the other side, and he waved his arm in a very undignified way and walked to the middle of the road, and I walked out and we met and shook hands, and he was not dignified at all. I said, "How are you?" He said, "I am all right; I have not forgotten about that $40.00 cow." The application of that you can all make.

Another point I would like to give in regard to the dentist's care of his nervous system is the matter of sleep. If I were talking tonight to doctors I know that they need this advice, but really I don't know whether I need to give it to you at all or not. Perhaps I may make clear what I have in mind by this: Our nervous system is wearing itself out, more or less, all the time from the moment we rise in the morning until we go to sleep at night. You cannot stop thinking about something or other all the time. The nervous system sometimes gets out of food, does not assimilate the nutriment that it needs, so that it becomes impaired. The poet has said, "Tired Nature's sweet restorer, balmy sleep." If a man wants to rebuild his nervous system for the wear of the day, sleep is the time when he gets it. I don't know as I can better emphasize that than in this way. I know a certain lawyer in Detroit who is one of the big fighting lawyers. He is one of the lawyers who goes into court and fights big cases. There was a great case going on here some years ago, and this lawyer was attorney for one side. There were a number of well known lawyers from different cities on the opposite side. The case went through the court for three weeks. At the end of the three weeks this Detroit lawyer had rosy cheeks, fresh countenance, and he fought as hard and as easily the last day of the three weeks as he did the first, and the secret of this was simply this: During the course of that trial he went to bed every night at eight o'clock. Whenever anyone came and said they wanted to have a conference with him, he said, "You can have it before court opens in the morning, or after it closes in the afternoon, but I won't have any conferences in the evening." While the lawyers on the other side were having conferences extending from 1 till 3 o'clock in the morning, he went to bed at eight o'clock and had a long night's sleep, and went to court the next morning prepared to fight. What did he do? He was using his brains as a man should do. All the day he was in court, and then went home at night and went to bed, and his brain was recuperated. It was refreshed absolutely after a long sleep, and he came fresh to work the next morning.

I have advocated that the dentist should have some hobby that he rides. I would not advise him to ride the hobby of poker because it lasts so long into the evening.

### DISCUSSION

C. C. BOWLES, Detroit: Let a company of dentists discuss the conditions under which they work and all agree that they are unnatural, unhealthy and conducive to anything but a vigorous, unsoured and self-possessed old age. Yet the minority is small indeed which gives any systematic thought or effort to counteract or minimize the effect of the deteriorating influences to which they are daily subjected. The confinement, the unnatural position, the bad air, eye strain, and the nervous tension under which we work, we accept as inevitable. In fact, if we started out with a good constitution we give but slight heed to it for the first ten or fifteen years of practice. Then, though still young in years, we begin to realize that we have drawn heavily on our vital account; we note that the elastic step, the love of work, and the zest of life are not as keen as they were wont to be, and that the ills of older men are descending upon us. Little irritations that once left us undisturbed now get on our nerves and interfere with digestion and the wife's pie is not like that which mother used to make. To the cringing patient, with whom we were once so gentle and sympathetic, we now bark ''open'' and we proceed to buzz out his odontoblastic fibrils with unrelenting callousness. That is the impulse, at any rate, and if we refrain therefrom it is at the cost of a supreme mental effort. Before the day is two-thirds over our back aches, our nerves tingle, our stomach is in revolt and we enjoy all the symptoms so simply and truthfully set forth on the wrapper of Lydia E. Pinkham's Vegetable Compound. If we make a sprint of a hundred yards to catch a street car we finish on the verge of collapse and have hardly caught our breath when the next car dashes by; in fact we are still blowing when a car finally stops. Now I know you old men of thirty-five are growing impatient and are asking why I tell you these things as if you didn't know them. Of course you know them. I don't expect to tell you old fellows anything or to budge many or any of you from your impacted habits, and yet a surgical operation may accomplish even that. I am talking to the young men. I was asked to talk to the young men. To them I would say that the ills to which I referred and many others not referred to, need not befall them. They are unnecessary, and may be avoided. Even the man who has practiced fifteen, twenty, or more years may yet undo much of the harm done, if he will; but the chances are he won't. It were better, therefore, to begin right.

### CONFINEMENT

From the beginning the young practitioner feels the irksomeness of confinement. If he is conscientious and anxious to do all in his power to build up his practice, he never leaves his office alone during office hours, with a sign on the door reading, ''Back in ten minutes,'' while he goes off to the ball game. Every minute during office hours he is at his post, for there is no telling who may call during his absence and how far-reaching may be the effect upon his practice of that false legend. Having little to do during the day, he is glad to work evenings, and it may be Sundays. Consequently he is within doors a large part of the time. For much of the time he is physically inactive and quite likely in a badly ventilated, overheated and artificially lighted laboratory; for it does not look well to be found asleep on the reception room couch or to be heard snoring from the comfortable office chair. These are trying days, physically, mentally and financially.

If a young practitioner appreciates the effects of this inactivity and confinement he will set to work to form such corrective habits as will completely offset the deteriorating environment of the office and the chair. He should take long walks. Not the lazy, flesh-producing amble of the policeman on the beat, but a vigorous stride which will cause the motorcycle cop to trail along behind to see if he is not breaking the speed limit. This is a splendid exercise. It is open to all and costs nothing. He should religiously get all the outdoor exercise his time and finances will afford. Tennis, golf, baseball, boating, swimming, or, the not-to-be-despised sport of gardening, one or more of these he should make as much a part of his program as going to his office in the morning or as collecting his accounts or promptly paying his bills. In the winter months the offerings of the physical department of the Y. M. C. A. are most excellent. I won't undertake to enumerate them. I shall leave that to Dr. Modesitt. But I will say this, if any of you poor fellows, young or old, are not active members of that most praiseworthy institution you are missing more than you can afford to miss. Hand Dr. Modesitt your name and your check tonight. I'll vouch for your characters and ask him to swear you in. There's swimming over there all the year around, and the water is always fine. To the warlike sons of Mars toting a gun over the byways and pouring lead into or at the russet tomato can at thirty yards, affords a healthy tire and a good appetite. The only objection to this game is that in the absence of tomato cans the sports are constrained to shooting each other. I am not quite sure that this is commendable as a health measure. Understand, however, I do not pose as an authority. If, then, the young man appreciates the need of these outside diversions and enters into them enthusiastically he will keep his chest expanded, his lungs ventilated, his muscles firm, his organs performing their normal functions and his "work while you sleep" samples will go unconsumed. But few do fully appreciate these needs, and fewer still live according to their light. "If to do were as easy as to know what were good to do, chapels had been churches and poor men's cottages princes' palaces," and so while they recognize, in a general way, that for the other fellow the sedentary life is unnatural and harmful, they themselves expect to escape its consequences. Consequently few follow any systematic method of keeping the physical man up to a high standard of efficiency. Perhaps in no calling is the poise and self-control, dependent upon good health, more essential than in the practice of dentistry. Our patients come to us in dread of our operations. If we are nervous, or irritable or easily flustered, their fear is heightened and they and our practice suffer unduly. Before we can control our patients we must control ourselves, and this is most difficult if we are handicapped by any form of physical derangement.

As his practice increases the dentist spends more and more time at the chair. Much of this time he is doubled up like a fishhook with lateral curvature of the spine (I think our osteopathic friends have discovered that most fishhooks have at least a slight sub-luxation of the spine), with his weight almost entirely upon one foot. This position contracts the chest, impedes respiration and circulation and interferes with the normal function of every organ and cell of the body. Try to inflate the lungs when in the doubled-up position in which hours are spent at the chair and then estimate how many of the 725,000,000 air cells of the lungs get a chance at the oxygen at such times. Inevitably the waste products accumulate. Before their time the powers of resistance are broken down and the lungs become a fertile field for the tubercle baccilus with which the emanations from the lungs of at least one out of seven of our patients are freighted. There is a measure of relief from this situation, however. The strained and stooping position at the chair is very largely unnecessary. By adjusting the chair, or the patient, or both, and by working by reflection, an erect position may be maintained for far more of the time than we commonly think. We are creatures of habit. We learned to stoop and work by direct vision before we learned to use the mirror, and we continue to stoop when we could maintain a comfortable position and work by reflection quite as well. Too often, however, we are obliged to occupy positions which cramp and tire. At such times it is well, when the strain begins to be felt, to step into the laboratory, if it is suitable, or the reception room if it is unoccupied, and go through some calisthenic movement which will send the blood coursing through the congested area and remove the accumulated waste products from the cramped muscles. It is surprising how this will relieve a backache and make one forget his weariness, and a minute's time will do it. At the same time fill the lungs a few times with good fresh air. If a habit is formed of stepping away from the chair whenever opportunity offers, and emptying and filling the lungs a few times, especially in the winter when the ventilation is not the best, I believe it will offset to a large extent the disadvantage of working so close to the patient's mouth. Another prophylactic measure which I have practiced for nearly five years and which I can heartily recommend, is outdoor sleeping. This insures an abundance of good fresh air for seven or eight hours of the twenty-four, and while it may not undo the harm of sixteen hours of overheated, under-ventilated confinement, it is incomparably better than twenty-four hours of such existence, and that is what many are getting throughout the months of winter.

A factor of great importance to the health and comfort of the dentist is good eyesight. Dentistry necessarily imposes a heavy task upon the eyes. Everything that tends to relieve this burden conduces to the health and prolonged usefulness of the dentist. Of course it goes without saying that the oculist should be consulted at the first evidence of eye strain or defective vision. The dentist may neglect his teeth, but never his eyes. As to what are the best light conditions under which to operate, however, does not go so unanimously. The general impression seems to be that a flood of light coming from two or three large windows is about ideal. That was my belief and, with such a flood of light coming from two or three directions, I worked for fifteen years. Hardly for a working day of that time was I free from eye strain or unconscious of my eyes. Before putting in the light in my present office I consulted the very meager literature on the subject which confirmed my growing conviction that cross lights such as inevitably come from two or more windows, a window which the operator faces while working, or reflected light such as arises from white walls or light decoration, is bad. As a result I put in a window 32 by 40 inches facing northwest, the window sill being about on a line with the top of the patient's head. The operating room is decorated in dark dull colors which absorb the light rays, consequently no light is reflected back into my eyes. It is altogether the most satisfactory light I have worked by, and from the fear that I should have to give up practice because of failing vision I now work with scarcely a thought of my eyes.

The nervous tension under which we work, due to operating on sensitive tissue and to controlling nervous patients who lack self-control, affects us, more or less, depending upon the mental attitude with which we meet the case, and this in turn is dependent largely upon temperament and physical condition. We should strive to rise above the plane of worry and irritability. If we allow ourselves to go to pieces with every exasperation we may soon go to Pontiac with a body guard. With one patient we stand conduct which in another would cause us to quiver from head to foot with resentment, demonstrating that it is not so much the act of the patient as our own state of mind that is the important factor. We must control ourselves, cultivate coolness, decision, calmness of judgment be firm yet gentle, patient and sympathetic, yet master of the situation. If from no higher than purely selfish motives, we must at all times endeavor to maintain our mental balance, permitting nothing to provoke us to worry, anger or resentment, for these are emotions far too costly to be indulged in. Better be hollow-chested, have stooped shoulders and a crooked spine than be mastered by every petty annoyance and develop a cross and crabbed disposition and a warped and soured soul.

J. B. Modesitt, M.D.: As I was sitting here I was wondering how this body of men compared with a similar body of men fifty or one hundred years ago. I presume there are some men in the house who could describe that better than I; the chances are, however, that we have not the vitality that the men fifty or one hundred years ago had. We are not outdoors enough. We run ourselves to death nervously. We do not get rest enough, and we do not get air enough and sleep enough. I don't know just how nerve-racking the life of the dentist is, because I have had very little to do with it. My first experience with a dentist was when I was about 17 years of age, about five years after a young fellow had hit me in the mouth with a rock and broken four of my front teeth, and I let it go, as a good many farmer boys do, until they had to be fixed, and consequently it was about five years before that job was done. I remember I came to the city and called on the first dentist I came upon, who happened to be a good one, as I remember he charged me $17.00 for that job of fixing up those four teeth. I would say to you that two of those are standing yet, and there is no sign of any trouble with them. The other two simply wore off from sheer wear. The post is still standing now, but the filling around it has been replaced twice. I have a great fear of the dentist. I know if there was anything that unnerved me it was the dentist.

I am sure that the life of the dentist is nerve-racking, for two or three reasons: (1) That it is entirely foreign to the kind of life and work that our ancestors had to do; therefore it is an unnatural position, and with the unnatural position, the body as a rule does not respond at all or get accustomed to it. (2) The muscles of the dentist are not as large as they were formerly. We used to need them to pull out so many teeth, but they don't pull out as many now as they used to. I can remember when it took a good strong fellow sometimes, and sometimes two, one to hold the patient and the other to extract the tooth. Now we have a way of doing things without work. The dentist does not even stand and pedal his machine any more like he used to, as detrimental as that was to the other leg, but the machinery does the work these days, and the man's muscle is soft without work, and all that multiplication of machinery.

As the dentist does not get this exercise, he has to take some artificial exercise. It seems to me what a man needs more than anything else is *blood*. It is surprising how our blood degenerates. Some men cannot run at all, cannot do anything that takes exertion. It reminds me of a big strong fellow who weighed over 200 pounds, a big strong man, and as he was walking across the campus he saw a man sawing wood and he says, "Let me get hold of that saw." He sawed only a very short time when he stopped and before he got far away he fainted. The fact is that he was a muscularly, strong-looking fellow, but he did not have strength or vitality. That is the way with many of us. We lack strength.

A man has a physique that is second to none in the animal kingdom, a man with two legs can outrun most four-legged animals. Take Weston in his travels across the country, and no horse could have kept up with him. A great many animals would have fallen by the wayside. That man, over sixty years of age, in good physical condition and able to perform a stunt like that. A girl came within seven miles of swimming the English channel. Man is just beginning to find out that he has to take some artificial kind of work.

We certainly need rest. Very few of us get real rest. I have in mind a young professional man who stepped into a club and played cards until half-past one; the next day he was out early, went to Lansing, was up again that night, got up the next morning early. He was a strong fellow and did not notice it at all, but if he keeps the pace up long it will begin to tell on him and he will not be able to do an average day's work. Another thing we need is air. It seems like an old story to most of us, but we don't get enough fresh air. I believe in this outdoor sleeping. I don't know whether you do or not, but it certainly is the thing that rejuvenates the blood over night while we are resting. A man comes up feeling better and stronger. I am not talking about the big muscle. I don't believe we want it. I believe the thing that we need is a good strong constitution. A man who can work his year out without illness, as a rule. He will certainly have to have air to do it. When a man stands at the chair and works all day, in the evening he is tired. He has not been doing much physically. He has simply been standing up—that is all. That requires very little effort. The trouble is that the blood has all settled down in his legs or feet. If he would run upstairs a few times during the day it would help some, and he would come down feeling better. Very few institutions have done very much towards physical training of professional men. We are just getting to it. The colleges have taken up physical training some time ago and some of their highest paid men are in the physical training department. Many other institutions have taken up physical training for boys, but very few have taken up physical training for professional men, and here is where we need it. If there is anybody who needs physical training anywhere it is the professional man who does little physical work during the day, and some organizations have been putting in equipments for this thing. The game of golf has been one of the greatest things for the professional man, it seems to me, ever invented in the line of recreation. We must have physical exercise. Take the fellow who takes the correspondence course and stays at home and works hard; it does not do him half as much good as though he had been out getting a lot of fresh air while he was getting a reasonable amount of exercise. Take the golf course and follow it up a few laps and you get thereby several miles of walk. It has done lots of business men good, because it is out-door exercise. We have been building big gymnasiums all over the country, and we have one or two in this city; we have plenty of light and air; we used to take the men and give them a good, hard setting-up drill, and the man, professional or business, would go home and be so stiff that he could not get out of the bedroom, and they thought that was just what they wanted. The trouble is that we worked him too hard and he was worse off than he was before he went in.

We should have plenty of exercise and have a good time while we get it, and then we will feel better, sleep better, eat better, and enjoy life in general much better.

There are only a few simple recommendations we can make, and that is that the man ought to put in from one to two hours at some kind of recreation every day. The advice about having a hobby, and riding it, was a mighty good one. I do not know a man in town who is not interested in some kind of sport, and whatever he is interested in ought to be the thing he does. It is hard for him to go out and play some kind of games, because he does not like it, or does not like that kind of games.. Play something you don't like, and it does no good. If you really like it, and play it hard, it really does you a lot of good. It is surprising how the men take to games. I have seen some men so wild over a game that you would hardly know them. He has real recreation, and it seems to me that it is important for the professional man to put in some time every day in physical recreation which he needs. Our forefathers used to walk, chop wood, work out in the open air; they had plenty of exercise, and it is said that if we are not crossed with country blood for three generations the family will run out, and I believe that is a fact. It is surprising how quick a body will go down if you don't work it; the body is made to work, and we simply cannot get along without it.

I will close by saying that I feel as if the time has come when the professional man will give more time to physical recreation. It is not all recreation to go to a ball game and look on from the bleachers, although it is a good thing as far as it goes; we go through a great many motions in our minds with the men on the ball diamond. We may yell some, make some noise, and that is good, as far as it goes, and we go through these plays and watch this man and that man, and it turns the mind away from business; it is a good thing, although it does not go far enough. We have playgrounds, but the business man is too busy to go out and use them. If they will not use the playgrounds, then they had better get it inside and use some of the inside playgrounds. We have a simple prescription at the Y. M. C. A.; we give them fifteen to twenty minutes of an ordinary drill, as uncomplicated as we can, also a game of volley ball, or something of that kind, to get up a sweat; after this a bath and possibly a swim. If a man will take something like that three or four times a week it will help wonderfully, or, better than that, if a man will go out of doors and do the old-time work that our ancestors did it would do a wonderful amount of good physically. I thank you.

Dr. J. M. Thompson: Mr. President, it has been my pleasure in the past few years to form an acquaintance with Dr. Inglis at Grosse Isle four years ago, and during that time Dr. Inglis and three or four other friends and myself indulged in the game of old maids or hearts, with the queen of spades in. During that time we have had very many conversations. I take it, from the doctor's talk and Dr. Modesitt's talk, and others, that they are all speaking from practical experience. The most interesting experience I remember of Dr. Inglis was about his father and the multiplicity of patients that he had in his experience at one time in finding out how much work he was doing, and how small his practice really was when it came to figuring in dollars and cents, and he said he was seeing a number of people in his office, and it came across him one day that there would have to be a change, so he put a sign up on his door or office: "Visits are spot cash. This means you. See the doctor." He said that something very funny happened. People suddenly remembered that they had another engagement and could not wait, and from that time on it meant ready money for the doctor, and it was a great deal less nervous strain. I think that is one of the things he forgot to tell. There is a parchment which hangs on my wall just as I go in the door with something about an omnibus at the top, I don't know just what the rest is, but it has a few hieroglyphics on the bottom, and that has enabled me to live in the storm after twenty years and practice dentistry, since I noticed the date the other day, the 28th day of February, 1892, so that means I have been here for twenty years. During that time I have had lots of opportunity to wait for the people to come, and to work nights and Sundays, and I have had a chance to sit down a minute and have some people say, "I think, doctor, I cannot come any time during the week. You will have to see me on Sunday." I say, "I am sorry, as I do not work on Saturday afternoon unless I feel like it, and I don't work Sundays." I think some of the rest of you could do the same thing if you wanted to. I have two chairs in my office, and sometimes I shine at only one, and I think that I will use two from now on, much less than I have done, but what I want to say is this: that it has been said that medicine consists of 25 per cent knowledge and the rest is jolly. That may be true to a certain extent. It may be so in our own business. I think if there is any man who needs to be jolly with the people he comes in contact with, it is the dentist, and there are some of our subjects that a good sharp burr and a little bit of jolly will assist us in the speedy preparation of a sensitive tooth, all the things that are put on the market, like the ether spray, or gas apparatus, or pressure anesthesia, and so on, and the people will thank you ten times over for getting through so quickly, and then have some little remembrance in the way of something said in a nice way, or some funny reminiscence, and they will go back feeling good about it. Although I am not a heavyweight, I think I can hold my own with some of the rest that are a little more strong. Doctor Bowles is looking fine and I am glad to know that he can do the stunt Jeffries did.

Dr. John Hall: Mr. President, and Gentlemen, and Ladies: I think that it is the duty of every person, not only dentist but every person, to have some little habit or diversion that takes them away from the duties that are incumbent upon them in their own office, and one of the best things I have to do and get your attention turned from them is to get on some commission as I have. The only thing is that I find it very hard to afford to be a commissioner, because commissioners as a rule are not paid well, and they have to devote a good deal of time, but what you get leads you to believe that you are getting something anyway. That in itself is a great reward, that people think you are doing something, and this commission I am on is affording me a great deal of diversion and entirely away from the dentistry when I am engaged in it. I took the opportunity last year of electing about ten or a dozen of the dentists belonging to the society, and took them over to Eloise one day, and I think I diverted their attention and they enjoyed it and saw the great work that was being done there, and also saw, I believe, that it was a great honor to have one of their presidents on that commission. Studying up the history of Detroit, I find I occupied a unique position. I am the only dentist that ever was on it in the city of Detroit. I have always had an idea that most of the mayors were pretty wise, but I found that none of them have been wise enough to select men from such an honorable profession as this—that they are not as wise as I thought they were. I think in the future there will be many more dentists on commissions, and if you are you will have all the diversion you want, and you will have a reward that will make you entirely forget your business.

Dr. N. S. Hoff: I have found myself subjected to conflicting emotions while listening to this discussion. When Dr. Inglis got through speaking I had firmly resolved in my own mind to become a Christian, as I felt convicted by convincing utterances. And when Mr. Modesitt spoke, I felt as if he also was a man after my own heart. I suppose many of the things Dr. Inglis told us are the kind of advice we get from medical men. From the time I entered the profession I have always worked hard at it, and I fear I have consumed, not only the daylight hours, but the night hours also, and I must confess I continue to do this. I do not know that my health has suffered materially, but as I look back I can see that I have done an awful lot of work. I would not like to look forward to doing as much in the future as I have done in the past, and yet I do not believe that we work ourselves down and out. The exercise that we get in the office, although it is in a close atmosphere, is not unwholesome, and we live in it as a natural environment. It may be unwholesome sometimes, I have no doubt it is. I presume there are conditions of our bodies which at times would make it desirable that we have more air, better light and conditions about the office that are more ideal as far as our best health interests are concerned.

When I first began practicing I was associated with a dentist who had a large laboratory of several rooms, and in one of those rooms he had a large anvil and a big hammer, and it used to be my method of changing my mental conditions when I got so worked up and so nervous that I could not handle my patients properly, I would excuse myself for a few minutes and go out in that laboratory in the rear of the building and hammer that anvil until I recovered myself. After I had regained my equilibrium then I would go back and finish with my patients without any difficulty at all. I have no anvil now to hammer, but I have to pull myself together many times; and I think if I had one of those punching bags, or something of that kind handy, that I could tackle on occasions of this kind, that I could relieve a good deal of the distress that comes from the constant grinding which is one of those things that brings upon us many of the ills that throw us down.

Nothing spoils our eyesight more than that complex light to which Dr. Bowles referred in his discussion. I know dentists who are working in the western sunlight, and we all know that no sane man ought to do anything of the kind. Any man who can stand working in a bright sunlight pouring out of the western skies is, it seems to me proof against almost anything.

There are so many of these unfavorable conditions around us that we cannot get away from that I realize that nearly everything that has been said here tonight has an important bearing on our health. We cannot all play golf or have a swimming pool in the back yard, as our friend Thompson says he has one in the basement of his house The best most of us can have is a bath tub, or possibly a punching bag. I am a member of a golf club, but I find it impracticable for me to go out there every day to play. It is over a mile away from my home, and for me to walk out there and play around the field once takes an hour and a half, and it consumes two and one-half hours of my time by the time I get back home and I am tired out. It seems to me that our conditions are such that we can't change our habits even if we want to.

I was wondering tonight how, for instance, our presidential candidates manage to exist. We all remember how, a few years ago, when Mr. Bryan was candidate for president, how he skipped around this country making six or eight speeches a day for the whole campaign. Mr. Roosevelt has done practically the same thing, and so has Mr. Taft and others. How these men can live and do such things is a mystery; one would think they would wear themselves to a frazzle in doing it. I admire Mr.

Ledyard, who has the ability and nerve to shut himself up in his office and admit his business one item at a time and dispose of it in that way. We cannot all do that. Our patrons come to us many times when we are engaged with some very important piece of work that we want to get done right, and if they come with a toothache we must stop and relieve it, though it adds greatly to our already heavy burden. Oftentimes the work is piled up on us in a way that we simply cannot get away from it, and we cannot escape from it if we would. We cannot make definite plans and rules for so much exercise and so much work. Suppose we had Mr. Ledyard's disposition and method of taking care of his work and that we knew as much about right living as Dr. Inglis does, it seems to me most of us would feel that we should jeopardize our business and professional ideals and our means of accomplishing things to such an extent that we could not possibly do the things that we are under obligations to do for our patients and for ourselves. If I had only heard Dr. Inglis tonight I believe I would have gone home happy, but because of the many sins I feel I have committed I am going home in a very disturbed frame of mind. Your plan of redemption looks so complex to me that I do not know how I can get any good out of it. I am going home to think this thing over thoroughly and I trust I may be able to see the way out of it. What we have heard here tonight will do us all good. I think some of you younger fellows who have not got so deep into the vice as I have ought to take this advice, because I know it is good advice, and you ought to take it. Whether I can take it and follow it is one of the things I will have to work out for myself, as I must change my whole life habits so as to get into this environment as it has been discussed here tonight. I do not want, however, to throw any cold water on what has been said by relating my own experience.

Dr. Inglis: I am grieved to the heart that I came so near saving him and now the man will sooner or later fall back into the clutches of the evil one. He acknowledged that he was almost saved, and it is a great thing to save an old sinner as our friend has recognized that he is. He says he cannot do it. Did it ever occur to you that when you get on board a steamer the first thing you want to know is, is the captain the captain of the ship. You feel mighty uneasy if you do not know that the captain is the captain. When a patient comes under a doctor, nothing does that patient more good than to feel that he is in the hands of a man who is a master of him, and the professional man who takes the position of any master of his business and therefore inspires confidence on the part of the patient that he cannot inspire in any other body. Now, my office girl has instructions that if anybody falls down in the waiting room in an epileptic convulsion, she has the liberty to rap on the door and tell me somebody is in the waiting room. That is not so much on account of the epileptic as it is on account of the annoyance that the epileptic is to the other people who are waiting there. But aside from the epileptic they have all got to wait. I think that the doctor will sum up his resolution in ''resolved that I will be saved,'' and simply say, I have got this important piece of work in my chair; I have this piece of bridge work that must finely be done, and it cannot be finely done if I stop in the middle to pull somebody's tooth, and will simply say to the other people who want to interrupt him, ''you can stay out there with your toothache or you can go away.'' If the doctor once assumes the position of Master of his own self and his own business, you cannot drive those people away with a club.

Dr. Marcus L. Ward: I am one of the unfortunate ones who was forced to learn how to live. Up to two or three years ago I had in mind spending my vacation at something pretty active, thinking that what I needed was something to muscle up a little bit, and I was confined to indoor work from the time I was about 19 years old, teaching school the year around, and got out in the summer time to muscle up. It did me a great deal of good. The result was that I went in with a young man who was, fortunately, my cousin, and he took me in tow. He was a physician, graduated from Ann Arbor, and I spent a part of one summer with him. He gave me some advice that

I have practiced for the last nine or ten years to great advantage. He told me what I wanted was not a whole lot of muscle nor appetite; he said what I wanted was the sun. He pointed over to the railroad running through the town and said, "You better run through there and lie in the sun and air than do the active work you are doing." He said, "You need a reasonable amount of exercise and entertainment." From that time on I have fallen into the hands of two or three men like Dr. Parshall, who taught me how to live across the water, and he has to work part of the time, and devoted the rest of the time to play, and I think he does that pretty well. He dragged me out. There were times when I simply could not work; he would not allow it. We went out together and purchased a gun or two, and went out at times when it meant a great deal to me to be inside, financially and otherwise; but at the same time I feel that it did more for me and my health than any other thing I have done. I have been some four or five years learning all the sports and entertainments I could pursue and carry on my business, and I have found three or four that have surpassed most of the others, shooting in the fall, boating in the spring, and have gotten interested in trapping, which is not very active, but during the winter we have three or four sports that we make a study of and have lots of fun out of, and it is that change of thought and attention which Doctor Inglis spoke of; that thing has been a great thing for me. I feel that it has been with the advice of the physician, Doctor Parshall, in getting me started, and I have learned how to live and carry on my business without neglecting it, and have found out a man can do better work, a great deal better, in four or five days a week than in six or seven. I actually feel that I am doing it better than I have ever done when I worked six or seven days. I work hard now, too; once in a while knock off and have a good time, and still I am doing a great deal more than I did when I was staying at home.

Dr. Stone: I would like to endorse what my friend Dr. Modesitt said about the outdoor sleeping. That is something I became interested in about a year ago, and I have been afflicted with a very sensitive mucous membrane which is very unfavorable to myself and certainly very unpleasant to the patients. I consulted my physician about three years ago in regard to it and he advised cold baths, a nasal douche, etc.; all those things I followed out. I followed the cold baths for about two years religiously, and still I had colds. Finally I concluded that possibly it was more fresh air that I needed, and last spring I had a hurricane deck constructed at the rear of my house. I have been occupying that with my family since then and it has been very beneficial. I have got through the winter with only one very slight cold, and have been feeling fine all the time, and as far as exercise is concerned, I have found out that attending to my furnace has furnished all I needed in that line this winter.

Dr. Chas. P. Wood: Twenty years ago as I was getting ready for college the doctor sent me away with quite a serious illness, some thought tubercular trouble, to regain my strength if possible, in order to take up the study of dentistry. I took the doctor's advice, went away for a few weeks, came back and took up the study of dentistry, and in the course of three years was ready for practice. I am not able to see wherein dentistry is a hard profession; that is, wherein it is not a healthful profession, as compared with other businesses or professions. I did all sorts and kinds of work before entering college; I was in several kinds of business, worked on the farm for three years, traveled for four years. I have never found anything quite so healthful as dentistry, and if you will pardon me I will say that I worked like the Devil himself for several years, having taken up the practice of my preceptor, who had practically killed himself in dentistry, and he never even made a living. I took his practice when I was in college and saw wherein he had failed. He had no business tact, but was a fine dentist, as good as I ever knew. He did his work for nothing, and when he had to quit his patients came in and said what a fine dentist he was. He charged ditch diggers' prices, and his patients did not find out that he was a good dentist until he was unable to practice longer. When I took his practice I tried to inject what business ability I had gained into it. Working for his own patients, I charged them two or three times as much as he had charged, and they never kicked very hard, either. I made a living for myself as well as my preceptor. Don't understand me that I mean to charge exorbitant prices. It simply means that we must use common sense. If we work for ditch diggers' wages, of course we must kill ourselves to make a living for the family, and something for a rainy day.

Now, someone has said that the foul air of the dental office kills. I think that is a mistaken idea. We do not need to have any such conditions. I have not worked one hour in fifteen years in my office, or all the time I have been in practice, without one or two windows open. I have always been a crank on fresh air, because I have great difficulty in breathing in anything else. If any of you gentlemen here work without a window open, I think you make a mistake. I suppose I am a crank on prophylaxis, but every one of us can do this—instead of working over a foul mouth as a general practice, the minute that patient strikes the chair wash out his mouth, or make him do it, with the strongest antiseptics. When you have done his you have not a foul mouth to work over. You may have a comparatively sweet breath in five minutes. Then, before working for days and weeks over that mouth in filling cavities, take all the deposits off and make the teeth clean. This will insure a sweet, healthy atmosphere to do the bulk of your work in afterwards.

I began several years ago to take one month out of the summer. Last summer I went to Orchard Lake for four months, and made no pretensions of coming to the office Saturday, and part of the summer Friday, Saturday and Sunday. Besides this, I took off six full weeks. In spite of this, because of the fact that I was in better trim all the time, my cash book tallied up $2,000 more at the end of the year. Better than all this, I got the habit of leaving the office early, 4:30, and have kept it up ever since; and in consequence have not worn my glasses in nine months, things I had worn for twenty years before. Let us work less hours, get proper pay for it, live our allotted time, and whether the patients like the price or not, give them the best service we know how, and I believe we shall be quite as satisfied with our achievement at the end of our dental career as we would if we overworked ourselves with long hours and short fees. Show me a man who works for very small fees and yet does good work, and I will show you one ready to be transplanted to the next world.

**You must not only be cheerful, but stay cheerful, too. Don't be like the revolving light, flashing out one minute and submerged in darkness the next. Send a steady ray of cheer throughout the year.** —C. B. J.

# THE TECHNIQUE OF IMPRESSION TAKING AND MODEL MAKING.*

BY RODRIGUES OTTOLENGUI, M.D.S., D.D.S., LL.D., NEW YORK CITY.

IT MAY SEEM to some that I have chosen a strange topic upon which to speak, yet if one may be permitted to judge by models brought in as a basis for consultation, this surely is a branch of our work in which the vast majority of our profession might profit by instruction. Indeed, it is the one corner of dentistry in which the most slovenliness is exhibited. Slovenliness, demonstrated not alone in the illy made models, but what is far more important, slovenliness in the management of the plaster when taking the impression.

Why is it that so many operators use modeling compound? Not one per cent of those who do will argue that modeling compound is better than plaster of Paris for taking impressions where teeth are present in the human mouth. Why, then, do they use it in preference to plaster of Paris? Many will tell you, "It is so much pleasanter, so much cleaner, than plaster of Paris." But they make a mental reservation of the fact that they find it easier to use modeling compound; that, indeed, they do not know how to take impressions with plaster of Paris. Moreover, it is not true that modeling compound is either pleasanter, or cleaner, than

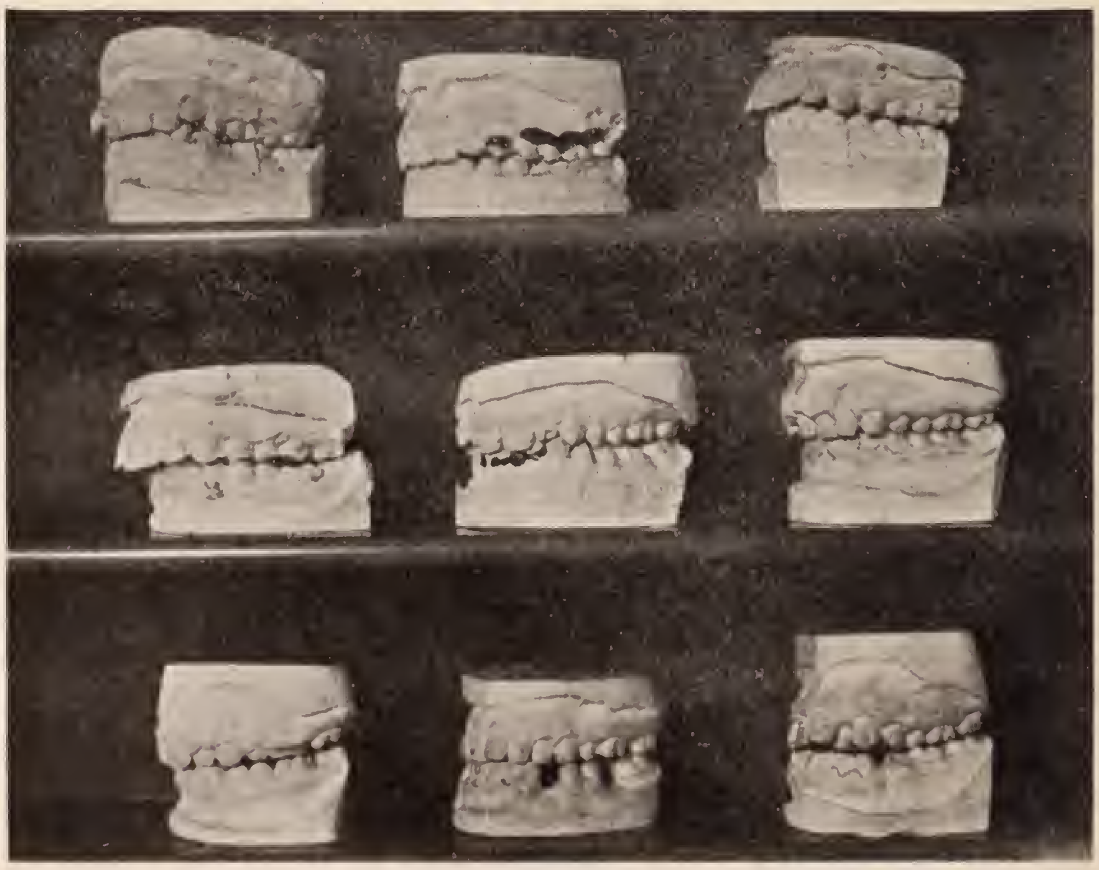

Fig. 1

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*A Talk before the Michigan State Dental Society, 1912.

plaster of Paris. It is a common experience of orthodontists to have some dental practitioner, or some pseudo-specialist in orthodontia, come in for advice in "a regulating case" and present models which really are a disgrace, and calmly remark: "Excuse these models, Doctor, I made them in a hurry." Oh, if these gentlemen but knew how sickeningly unoriginal that excuse is and oh, if they could but be made to comprehend how absolutely inexcusable are these "models made in a hurry!" Why should impressions ever be taken without time in which to do the work properly, and if done properly no "hurry" can excuse the operator from ruining them by producing models that are an abomination to the sight? For this is the fundamental point. No man, woman or child should be made to submit to the taking of even one set of impressions, unnecessarily. Hence, when the operator is in "a hurry" then he should understand that "he has not the time" to take the impressions or make the models.

In Fig. 1* we see nine sets of models, all made by the same man. They are above the average, and the fact that they are above the average is a disgrace to our profession, because they are far below the standard of what they should be. Let me pause a moment to explain why I consider the bad model-making of dentists a disgrace. It is because the work of rearranging the human teeth with its correlated remodeling of the human face is one of the highest arts. The same is true of prosthetic work. Therefore, both the orthodontist and the prosthodontist should be artists, and all their work should be artistic in character. Surely, the models used in studying and planning an artist's work should show some evidence of the artistic temperament.

Let me relate an incident to accentuate this. About a year ago a dentist called on me for "advice in a regulating case," as he phrased it over the telephone. At the appointed hour he called, handed me a set of models and asked: "What would you advise me to do for this patient?" I studied the models for a few moments while he placidly gazed at them with me, and then I said: "If you really have this patient's interest at heart I would advise you to place her in the hands of an orthodontist." "Why," said the dentist, "do you think that case so difficult?" "No," I replied, "it is rather simple." "Then why do you tell me to send the patient to another man?" And I answered very frankly, "Because you have not even apologized for these awful models. I waited several minutes for you to tell me that you 'made them in a hurry.' But you have offered no excuse whatever. Therefore, I accept them as an index of your artistic standards, and I would be sorry to place any child in your hands for such work."

He went away angry, whereas he should have been grateful to me because I told him the truth, and probably opened his eyes to a deficiency.

Glancing again at the models shown in Fig. 1, I say that they are above the average. They are above the average, because it is evident that the

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*THE DENTAL SUMMARY is indebted to *The Journal of the Allied Societies* for the loan of cuts illustrating this paper.—Editor.

gentleman who made them has come within the influence of the art of model making, inaugurated by Dr. Angle, and that he has aimed at the correct standard. The fact that he has not reached it merely indicates that his handicraft is not yet equal to his appreciation of what should be. But we observe that the models are all from plaster impressions; second, that something more than the teeth is shown; third, that some attempt, however crude, has been made at trimming up the artistic parts of the models. I use the term "artistic" here to differentiate between the anatomical and the other parts of the models. There is one glaring fault to be noted. In several instances broken teeth have been replaced and stuck fast with wax. Nevertheless, if the man who made these models is present tonight I have no doubt that he will produce better results in future.

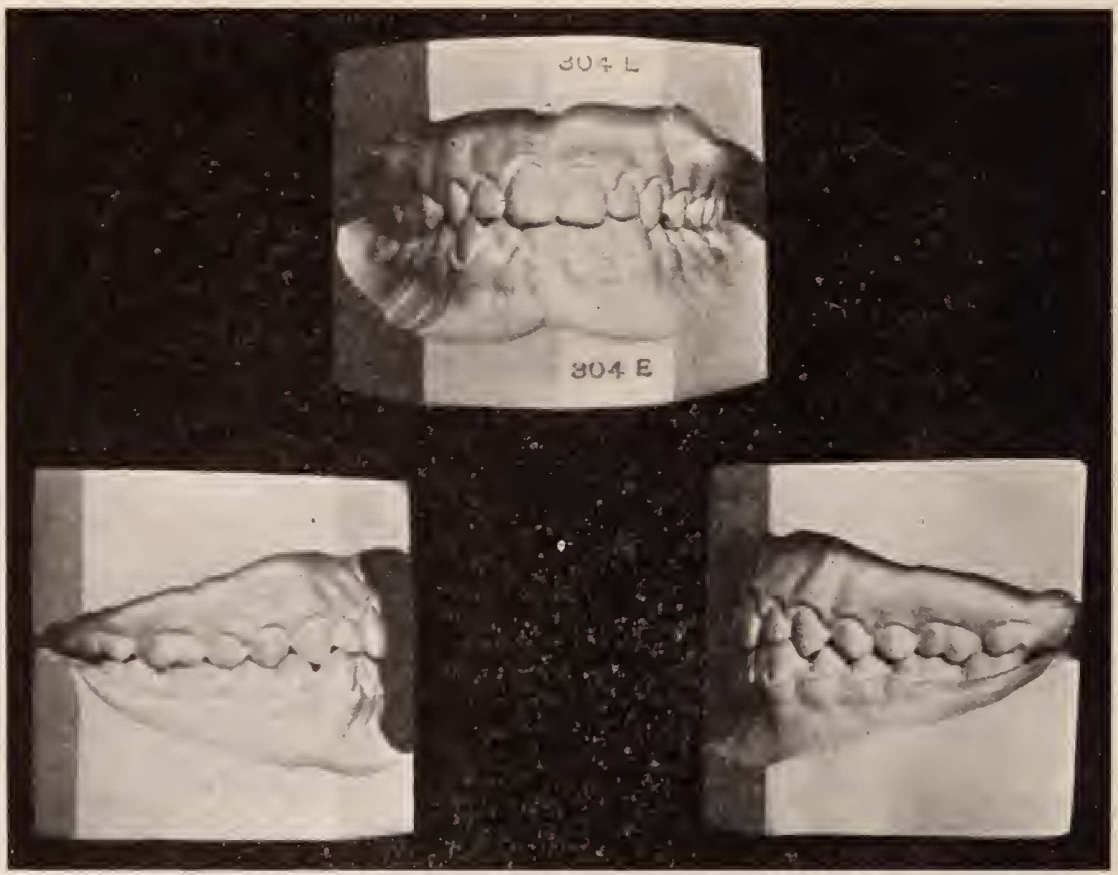

Fig. 2

In Fig. 2 I show you a set of models which, though far from ideal, yet I think compare favorably with those in Fig. 1. Models made in this style will look neat and artistic when placed in a cabinet, and this is an important matter, because the impression made upon a prospective patient's parents, when looking at your collection of models, may have an influence upon getting or losing the case.

### TECHNIQUE FOR UPPER IMPRESSIONS

Let us now consider the details of taking impressions with plaster of Paris. The first essential, of course, is the plaster, and this is often a serious problem. Plaster makers have told me that the working qualities of a barrel of plaster may be materially altered by moving it from the warehouse to the dentist's office on a rainy or even on a damp day. Also that they have never been able absolutely to reproduce a given batch of plaster. With material as sensitive and as variable as this, we have but one recourse, and that is to purchase it in as large a quantity as may be convenient. The advantage of buying a barrel of plaster is that when you do happen to obtain a good working batch you have a plentiful supply. When my office was in a house I always obtained two barrels at a time, keeping them in the cellar. Now that I am in an office building and have not space for even one barrel I have obtained my best results by purchasing three cans of plaster at the outset. Then as a can is emptied another is bought. By this means my plaster is kept in my rooms for two or three months before it is used, and this seems to be an advantage, although even now I sometimes am forced to discard a can.

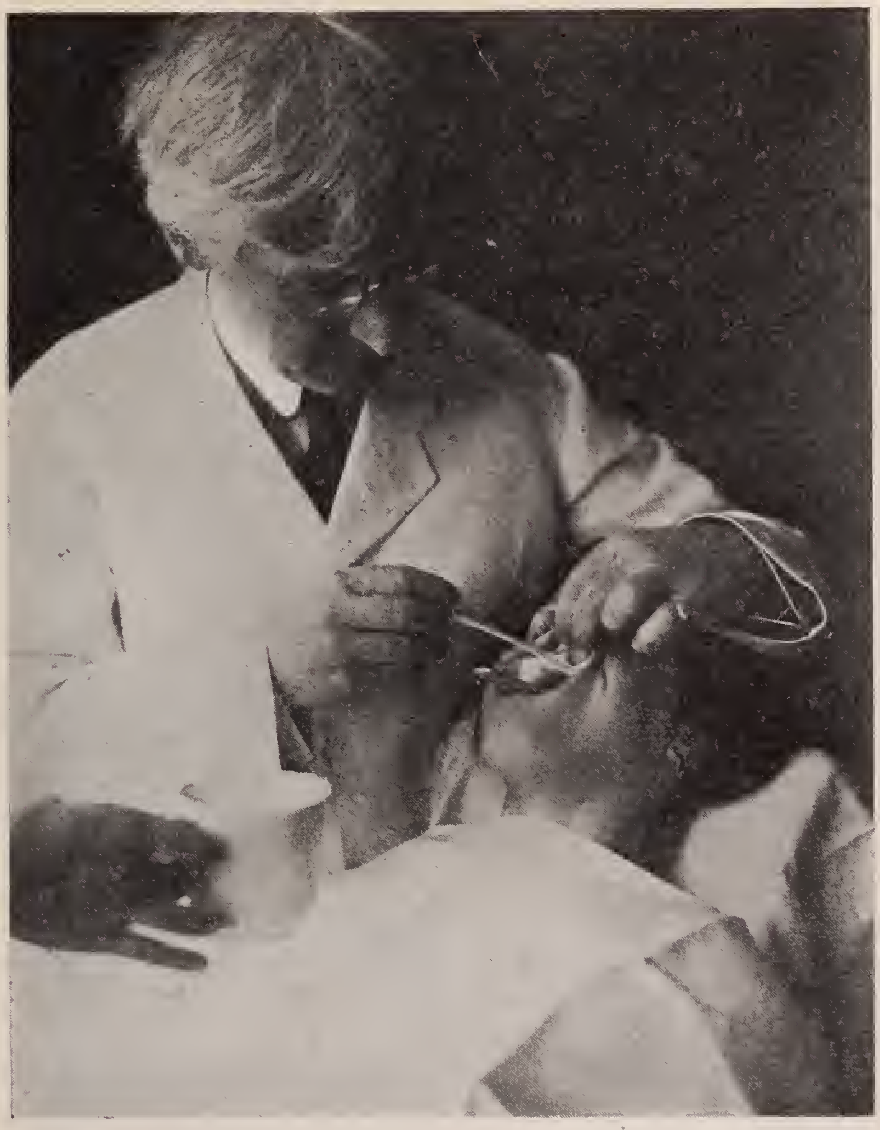

Fig. 3

I may say that I use what is known in the trade as "French's Impression Plaster," which is fairly quick setting, and I use it for both impression and model. I do not add any hastening medium.

In taking an upper impression the first essential is that everything should be in readiness and the patient fully prepared for the work in hand. On the stand I require a glass of water, a finger bowl, also partly filled with water; two or three orangewood sticks with cotton wrapped about the ends to serve as swabs; and I may say that the cotton swab should not be a great mass of cotton, but should be a small, tightly-wrapped swab. I also have a number of swabs made of Japanese bibulous paper lying loose upon the table. Also a piece of cardboard to receive the pieces of the impression when removed from the mouth; a pair of foil carriers; a pocket knife, with large blade open; a sharp-pointed instrument for scarring the plaster, and, lastly, a piece of soft sponge.

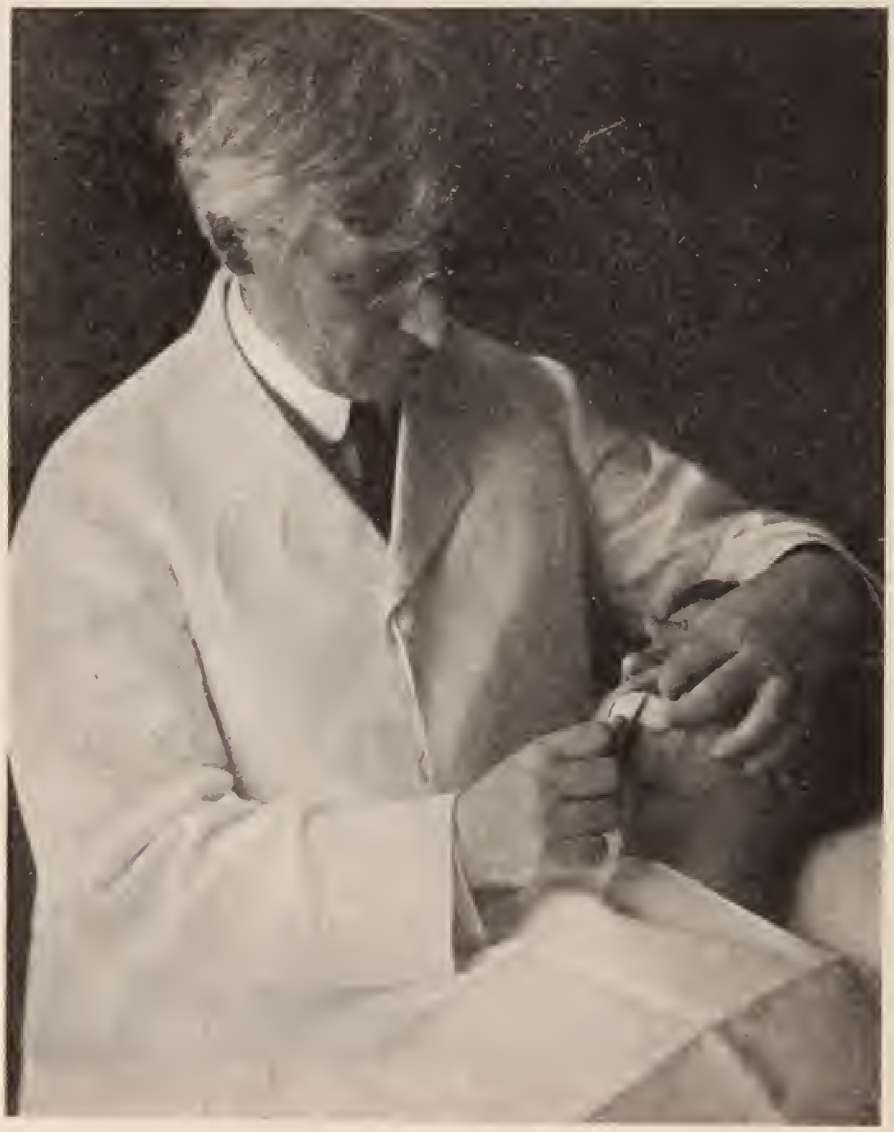

Fig. 4

By way of preparing the patient I explain in detail what I am about to do and what will be expected of him or her. For example, at one stage of the operation I require both of my hands, and consequently the patient must hold the impression tray in place by partly closing the mouth, as we shall see. This is not only explained to the patient, it is rehearsed. The patient is also assured, should she show any anxiety on that point, that no plaster will trickle down her throat; that the chin is to be kept up and the head thrown back; and, with the head in this position, she is asked to try to swallow, whereupon she will discover that she cannot. A properly-fitting tray is selected for the case and everything is in readiness for the impression.

The plaster for the impression should be sifted into the water and allowed to sink below the surface until the proportion of plaster and water produces the consistency of "double cream." The mouth should be examined to note whether the vault be high or low. If very high, a little plaster should be carried to place in the vault before introducing the tray. The plaster should be placed in the tray cautiously, lest there be an excessive quantity. There should be just enough to fill the deeper parts of the tray, up to, but not higher than, the edge of the rim. Only a very little, if any, should be placed over the high part of the tray—that is to say, that part which conforms to the vault. A tray thus filled is carefully introduced and gently pressed up, until the teeth are fully submerged in the plaster, but no more. The patient is then asked to close gently, in accordance with the instructions given at the "rehearsal," and to remain at rest as soon as the lower jaw is supporting the tray. This releases the operator's hands. There should be so little plaster in the tray that none is in view; certainly none should escape to soil the face and generally mess things up, as would be the case if an excess were used. The left corner of the mouth is now lifted up, as seen in the illustration (Fig. 3), and plaster is introduced with a small bone spatula. For this purpose I use a common bone envelope opener. With this, plaster in small quantities is placed over the gum in the molar region and then forward over the bicuspids, cuspids, and incisors, carefully manipulating the plaster to avoid imprisoning air and thus forming air spaces. Reaching the median line, the opposite corner of the mouth is lifted and plaster introduced on that side in a similar manner, always working from the molar region forward, wasting no time, but never operating in a hurry.

The plaster thus having been placed over the soft tissues in the buccal and labial regions, the head is tipped far back, with chin up. The operator, by stooping slightly, is now enabled to obtain a full view of the region of the soft palate. Placing a finger of each hand so as to support the tray at each corner of the mouth, the tray and plaster are forced upward gently. By this time the plaster, if not mixed too stiff at the outset, will have just begun to set, and as the tray is pressed upward the operator may watch it ooze out beyond the back edge of the tray, and may stop before sufficient escapes to cause any annoyance to the patient. Should the least bit more escape, as may sometimes occur, the operator promptly and delicately removes it with the cotton swab.

We hear a great deal about "nausea" and "gagging" during the taking of impressions, whether with plaster or with modeling compound, and I am positive that this can be more easily prevented when using plaster than when using compound. The reason is that the "gagging" is usually caused by some impingement upon the soft palate. By the technique here described a skillful operator can keep the soft palate clean and free from irritation at all times, whereas when using modeling compound it is practically impossible to prevent the material from extending back and pressing upon the soft palate.

Even when the soft palate is not easily irritated, it should be watched and kept free from plaster, as here described, for another reason. The palate may not resent the presence of the excess of plaster of Paris while it is plastic, but it must be remembered that the soft palate is the movable roof of the mouth, and that in the act of swallowing it contracts downward. As soon as the plaster begins to set any saliva trickling into the back of the throat causes the patient to attempt to swallow; the soft palate contracts downward and fractures off the plaster that may lie against it, or beyond the posterior border of the hard palate.

It has already been explained that with the technique described this would be impossible, because no plaster would be lying against the soft palate. Nevertheless, in case this detail of the method should be overlooked and such an emergency should arise, the operator should be prepared to meet it with quick action; action fully thought out in advance. As soon as the particle of plaster is dislodged, the patient, becoming anxious not to swallow it, would throw the head forward. This not only prevents the operator from reaching the back of the throat, but actually invites the very disaster that the patient seeks to avoid. If those present will throw the chin well forward upon the chest they will at once discover that it is quite easy to swallow with the head in that position. But if they will throw the head well back, it will be found that the act of swallowing is made most difficult. This should be fully explained during the advance "rehearsal," so that the patient, should any accident occur, will not resist the operator, who must grasp the forehead firmly so as to hold the head back, and with the other hand quickly and deftly remove the dislodged piece of plaster with a swab. The best course, however, is to avoid the accident by keeping the back of the throat perfectly clean throughout the entire operation.

Once the impression has been pressed up to place it should be held firmly and immovable. A few minutes must elapse before the plaster will have set hard enough for a removal, and here I may state that the longer the impression can be kept in the mouth and the harder the plaster is allowed to set, the more perfect will be the impression and the resulting model. Indeed, this is the real secret of those well defined, beautifully outlined teeth and gum margins that you have so often admired in the cabinets of orthodontists. Their models are better than yours, largely because they allow the impression to remain in the mouth two or three minutes longer than you do.

It is important, therefore, that you keep your patient from becoming restless. To avoid this, keep the patient's mind impressed with the notion that the work is progressing. Keep busy: be doing something all the time. Use a swab and remove any particles of plaster that may break off. Take up the sponge and sponge away bits of plaster that may be about the mouth or face. If there is a free flow of saliva, insert the saliva ejector, and, in addition mop up the saliva with the paper swabs. But, above all, do something; do anything rather than just hold the tray in place and stand behind the chair, like a wax image, waiting. Remember that waiting is a tiresome occupation.

When the plaster has fully set, as may be tested by that remaining in the cup, the time will have arrived for the removal of the impression. Let me pause here to call your attention to the fact that I said "cup." Never bring one of those abominations, a rubber plaster bowl, into the presence of a patient. A white china cup is much better, much cleaner, and, besides, has a handle.

In removing the impression the first step is to remove the tray. The tray should be grasped firmly, the middle finger resting tightly against the roof part, and then with a downward and slightly backward pressure, the tray is dislodged, coming away clean and leaving the impression in the mouth, as shown in Fig. 4. Once more an examination should be made to be assured that no loose pieces of plaster may have broken away, with the possibility of irritating the patient and causing coughing or gagging, just when you desire that she should be most quiet. With the Angle trays, which are the best as yet obtainable, it sometimes occurs that a fracture may occur in the molar region. Occasionally the piece may come away in the tray; but sometimes, though broken away from the main mass, the piece

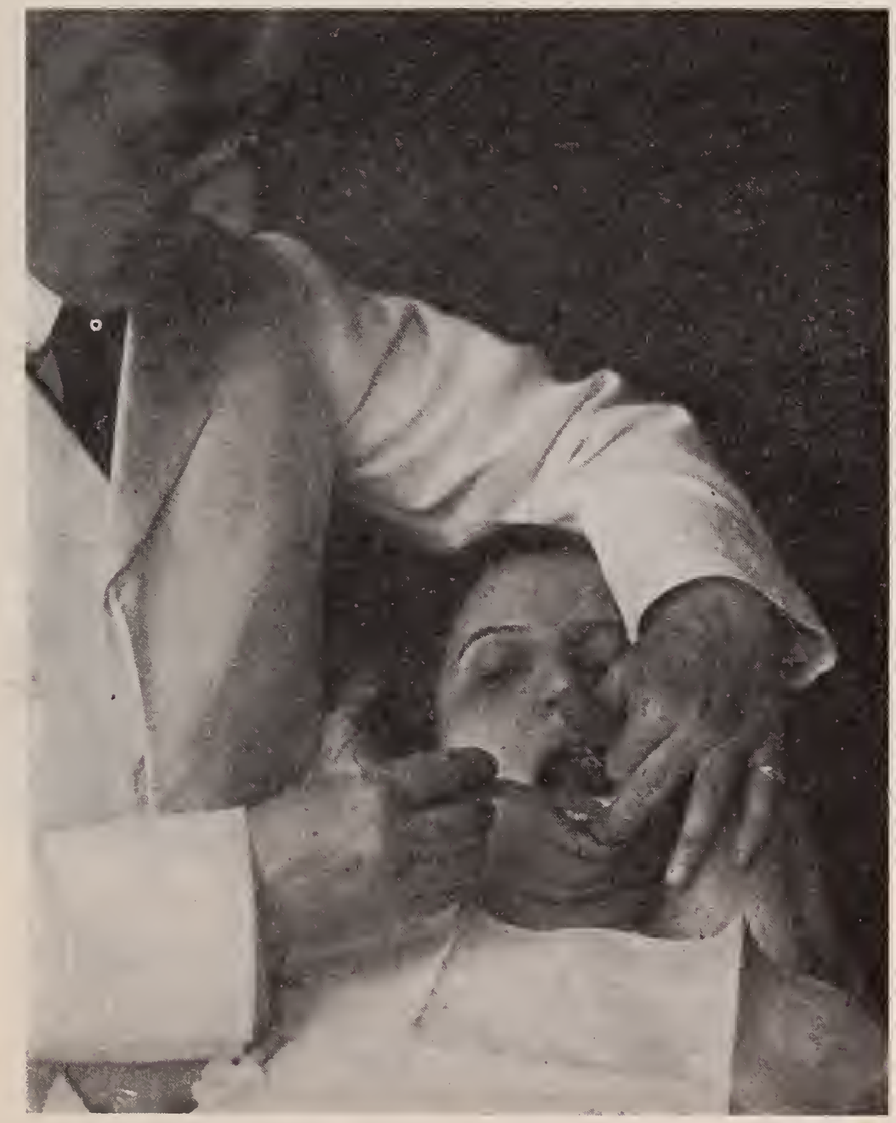

Fig. 5

or pieces may remain in place. The molar regions, therefore, should be observed, and such pieces removed first. Next an incision should be made in the plaster in the region of the canine fossa on the left side. I use a right-angled scaling instrument for this purpose, but a sharp hatchet excavator will serve as well. This cut should pass almost entirely through the plaster, care being observed not to pass completely through and wound the soft tissues. Next the wide, thin blade of a pocket knife is forced into this incision, as shown in Fig. 4. The knife is then twisted distally and outwardly, dislodging the buccal fragment. The same method is followed on the right side, the right buccal fragment being removed. The central, or incisal, fragment may then be removed, after which the part in the roof of the mouth may be carefully teased down and out.

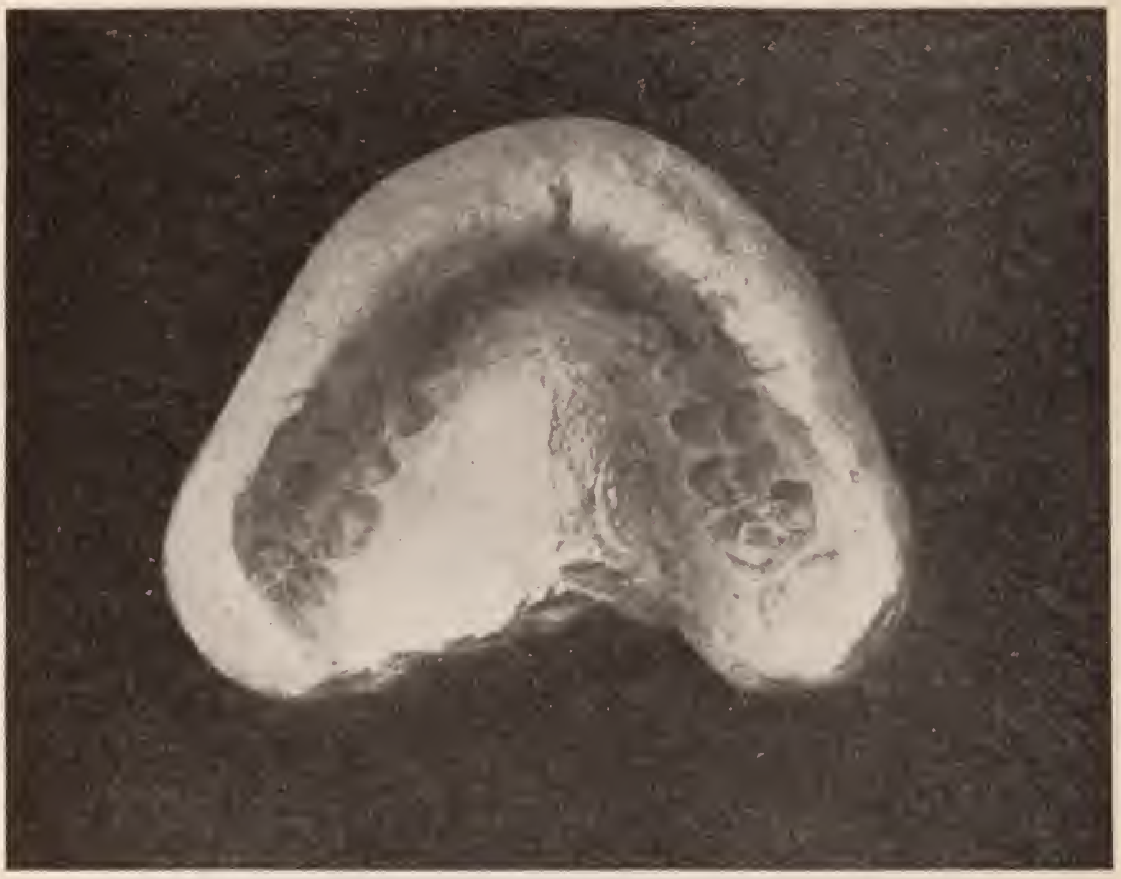

Fig. 6

As the fragments are removed from the mouth they are placed upon the card on the table. This card is a part of the office system. Upon it the name of the patient is written, and upon it are to be placed first the impression tray and the fragments; next the assembled impression; then the retouched impression; then the varnished impression; then the impression after it is poured, and finally the model itself after separation, and until it is finally finished and placed in the cabinet. Thus at all times this card is a record by which may be known the name of the patient for whom the work is in progress. When there may be a number of patients for whom work is in hand, these cards will prove to be a great convenience, as a certain and ready means of identifying work in all its stages. These cards are cut for me about 6 x 8 inches in size.

It is my custom to assemble the impression immediately. Plaster alters its form during the process of setting, and the impression can be more accurately assembled while wet. I prefer also to assemble the fragments in the tray. I therefore take the card containing them immediately to the running water faucet, and here I thoroughly wash the tray itself and the several fragments, special care being taken to remove all loose particles, however tiny, as such pieces prevent the proper adjustment of the fragments. The impression perfectly assembled in the tray may be pressed together so tight that often all cracks are obliterated. The impression is then swabbed out with the bibulous paper swabs to remove excess of water, and it is finally put away to dry on its card.

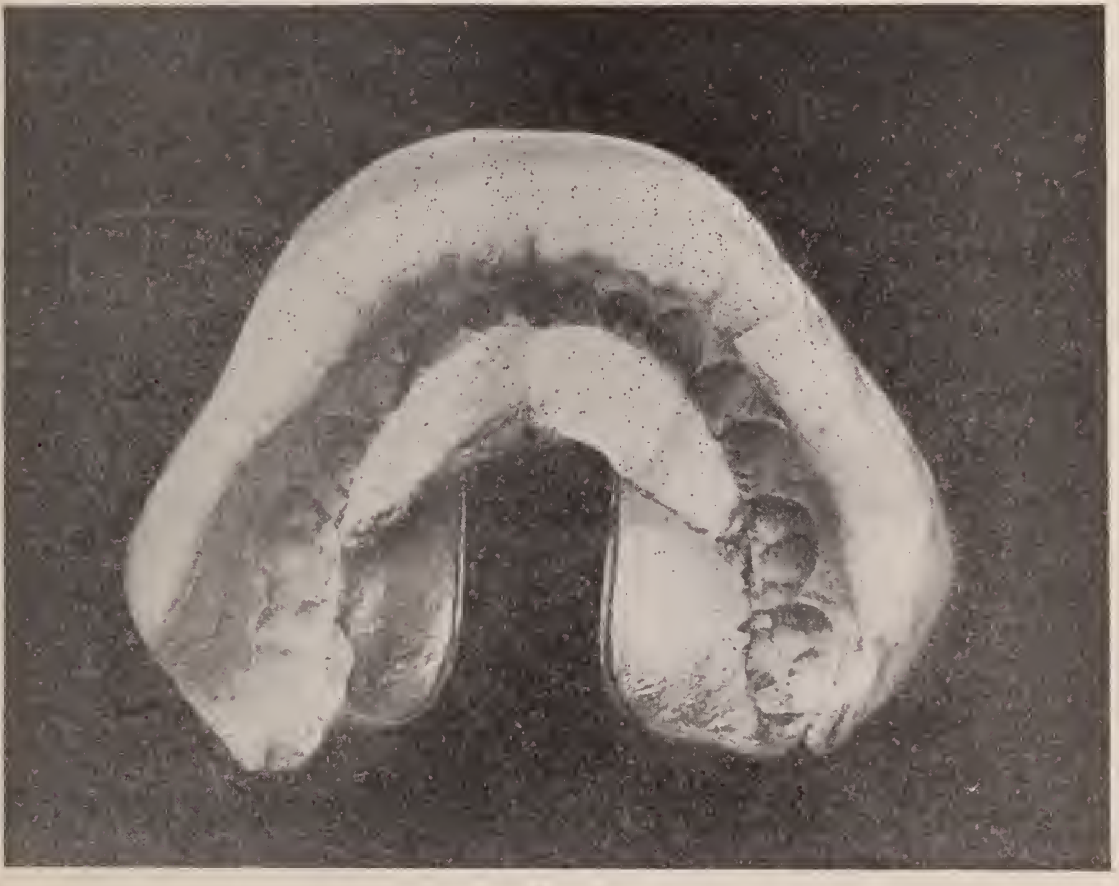

Fig. 7

## TECHNIQUE FOR LOWER IMPRESSION

The technique for taking a lower impression differs radically from that described for the upper jaw. Here we have new obstacles to meet; the tongue is present, and there is commonly a considerable flow of saliva to be reckoned with.

In speaking of upper impressions, I believe that I omitted to say that the teeth should be thoroughly cleaned and the gums well sprayed in advance. In using the spray it is my practice to direct the spray with one hand, while with the forefinger of the other I gently rub the surface of the gum, thus removing all mucus. This is even more essential when handling the lower, as a good cold spray will, at least temporarily, retard the flow of saliva.

In the upper jaw it will be remembered that the plaster was placed over the gums after inserting the tray. I recommend exactly the reverse in the lower. In my own office, where I can have the help of an assistant, I proceed as follows: The tray is barely filled with plaster, not overfull, and is placed on the stand in readiness. My assistant then places one finger in the left corner of the mouth and gently holds the cheek away, so that I can have good access to the buccal regions. In the illustration, Fig. 5, I show how this can be done working alone. Plaster is introduced with the little bone spatula and laid along the gums from the molars forward to the median line. Then the opposite corner of the mouth is stretched open and plaster introduced similarly, working from the molars toward the incisors, and being cautious to have the plaster flow evenly to avoid imprisoning air and creating air holes.

A common fault with lower impressions is that the lingual surfaces are often imperfect, especially back of the incisors, where too often we detect, when examining a model, that the operator has used his tray in such a manner as to bring the edge of it too close against the lingual gum margin. This may be obviated readily. After covering the buccal and labial surfaces of the gums and teeth with plaster, more plaster should be carried with the spatula along the lingual surfaces. The tray, with its additional proportion of plaster, is then quickly introduced and very gently pressed down against the plaster already in the mouth.

It will be observed that by this method the plaster is introduced against the gums and teeth in a very plastic condition, but that at the moment of pressing the tray to place it will have just begun to stiffen by setting. Therefore, it is possible to press down the tray without forcing any great quantity of plaster from under the tray, which would thus induce irritation, excessive flow of saliva and possible gagging. Nevertheless, of course, plaster will escape from under the tray lingually of the incisive region, and also back behind the molars. If this excess of plaster be permitted to remain, it will cause irritation of the parts, inducing an excessive flow of saliva, which, mixing with the plaster, keeps it soft and messy. The tongue also being crowded, will become active, and by moving about, may wash the plaster away from some of the surfaces. It is, therefore, more imperative in the lower than in the upper, to promptly inaugurate a rapid and thorough cleaning up. First the cotton swab may be used as in the upper jaw, and with a delicacy of touch that plaster may be removed which will be seen to be escaping in the molar region and trickling toward the entrance of the throat. Then the paper swab is taken with foil carriers and the plaster immediately under the tongue is swabbed away, the dry paper picking up the plaster pieces by absorbing its moisture.

We have now reached a period of waiting for the plaster to set, and it is quite important to keep the mind of the patient occupied. There is a psychological fact here of importance. In spite of any expertness that the operator may acquire, there will be a greater quantity of excess plaster when working in the lower than when dealing with the upper jaw. As the plaster hardens small particles are apt to be broken off by the movement of the tongue and cheeks, and these particles irritate and induce excessive flow of saliva. Hence, the operator should keep constantly busied cleaning up. In handling a lower impression I often use up dozens of paper swabs. It will be of advantage also at times to use one or two swabs wet, thus, as it were, washing the parts; this must be quickly followed with dry swabs to soak up the mixture. It may seem to those that have not tried it that we but add to our troubles by introducing more water, but the opposite is true. Indeed, in very wet mouths I frequently introduce the saliva ejector after removing the excess of plaster and then use a cold spray very freely. This cold spray not only materially aids in removing small particles of plaster, but seems to aid in abating the flow of saliva. At all events, one precaution is important. Before attempting to remove the tray, there should be absolutely no plaster in the mouth except that which will be essential to the impression. The mouth and the tray itself should be perfectly clean, with no excess of plaster nor small particles floating about. The tray is then carefully removed, the pressure being upward in the front of the mouth and downward over the molars. The tray is quickly set aside and the mouth again examined, when sometimes it will be found that the removal of the tray has fractured off small particles of plaster, which should be removed. Sometimes there will be larger pieces broken off between the cheek and the buccal gum. These should be taken out and set aside on the waiting record card for replacement when assembling the impression. The

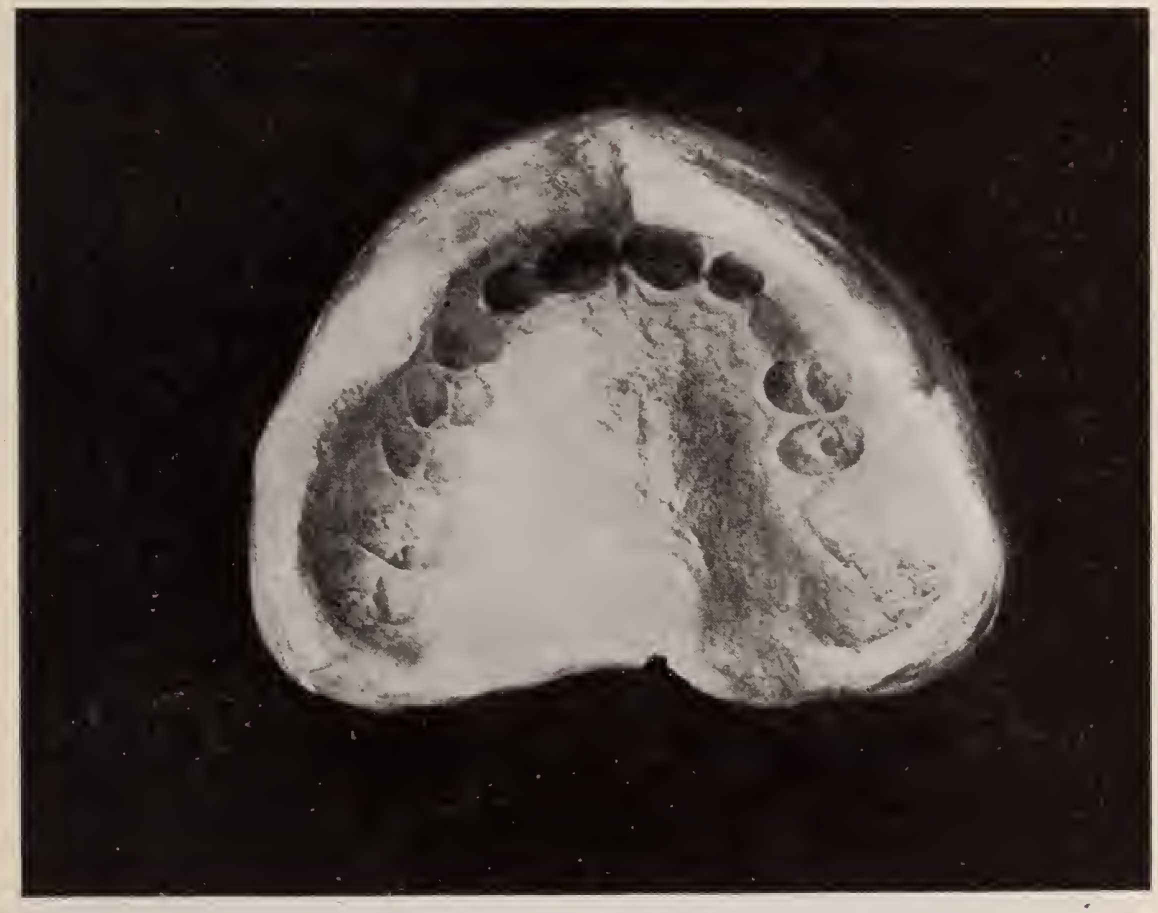

Fig. 8

impression is removed in the manner described for upper impressions, promptly assembled in the tray, and set aside to dry.

## IMPRESSIONS

I will now take the liberty of showing you a few impressions and making comment thereon:

Fig. 6 is an upper impression, unretouched. It is shown just as it appeared after assembling it in the tray. Please note that the fractures do not show. That is because the parts were assembled and the edges brought together forcibly in the tray, while still wet, and fresh from the mouth.

Fig. 7 is an impression of the lower jaw of the same case, freshly assembled in the tray. I must explain here that my photographer, in painting in black backgrounds for me, mistook my instructions and painted out the handles of the impression trays. In this illustration, however, the edges of the tray are seen at the lingual aspcet. This is a somewhat remarkably successful impression, the lingual surfaces back of the incisors and bicuspids being exceedingly perfect. Such a result could be had only where the tongue is quite still and the flow of saliva very slight. The imprint of the tongue is clearly seen and we note that it was drawn back in the mouth. This has slightly washed the plaster away from the lingual surfaces of the two last molars, which portions of the impression should be restored before pouring.

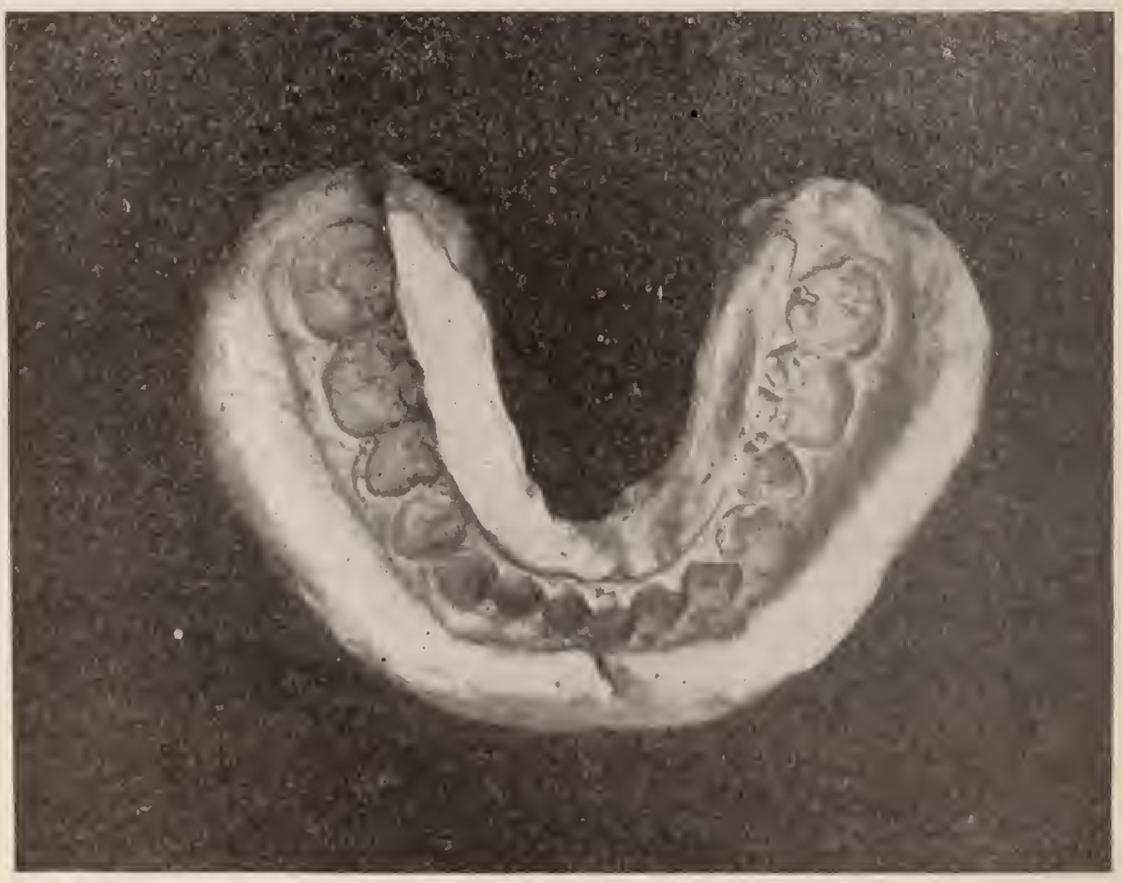

Fig. 9

Fig. 8—This is an upper impression after it has been somewhat restored by retouching, especially along the back border.

Fig. 9—This is a retouched lower impression of the same case. It is introduced as being the complete antithesis of the lower previously shown. Here I had to deal with a very active tongue, which could not be kept at rest drawn back. Consequently, I was obliged to remove the excess plaster from under the tongue in order that it might have room to lie at rest extended forward. Nevertheless, by having introduced plaster along the lingual surface prior to placing the tray, and by not forcing the tray down too far, it is observed that a good impression of the lingual surfaces of the teeth and gums has been obtained.

It is often possible in young patients to remove the impression from the mouth without fracture.

Also, it is just as easy to use plaster when taking impressions for young children as when working for adults.

I call attention to the method of treating lower impressions by attaching a layer of wax across the lingual surface from one edge to the other. This prevents the plaster of the model when poured from rising up along the edges in the space occupied by the tongue, and facilitates separating and saves much work of trimming up this part of the resulting model.

## RETOUCHING IMPRESSIONS

Even the most skillful operator cannot invariably produce an absolutely perfect and symmetrical impression in all cases. There are many temperaments and many difficulties present in some cases that may be absent in others. Again, the operator is not always at his best. Some days are more trying than others; a man may be ill enough so that really he should be in bed, and yet may be at work because professional duty calls. These and other reasons may cause one occasionally to obtain an impression not so perfect as he may desire. It is manifestly better to repair this if possible rather than to cause the patient the annoyance of a second impression. Even a moderately bad impression may be made fairly perfect by skillful retouching.

By retouching is meant the restoration of missing parts of the impression by the additions of plaster. This involves two things: an intimate acquaintance with the appearance of the hard and soft tissues in intaglio, and the ability to restore missing parts of the impression by adding plaster. This adding of plaster is done with small camel's hair brushes, and the method originated, I believe, with Dr. Norman W. Kingsley.

The requisites are several camel's hair brushes of various sizes, from very small to fairly large, a bowl of fresh water and fresh plaster, preferably of the same quality as that in the impression or model, though this precaution is more important in a model which is to be kept than in an impression, which, of course, will be destroyed. We likewise need one or more saucers.

A little water is poured into the saucer and a small mass of plaster placed just at the edge of the water. The plaster is then mixed in the water with the camel's hair brush and carried with the brush to the impression or model to be retouched. Small air holes are filled in with the smaller brushes, while large masses may be added, "painted on" layer after layer, with the larger brushes. The model or impression should have dried for at least twenty-four hours for successful retouching, as it is necessary for the dried-out plaster to quickly absorb the moisture of the newly added masses.

In retouching, air holes may be filled in, a fracture obliterated and the imperfections at the back of the impression and in the molar regions restored. Note also particularly, that plaster can be added outwardly along the buccal borders of the impression. This increases the width of the impression at these parts and is quite essential to the making of a good model, as will be made clearer when discussing the trimming of the models.

*(To be Continued)*

## HOLDING INLAYS WHILE POLISHING.

BY DR. G. B. SPEER, LOS ANGELES, CAL.

In the February number of the Summary, Dr. R. C. Brophy, of Chicago, gave a description of Dr. Moore's vise for holding inlays while polishing. My way is as follows:

Take a pair of Dr. W. Van Hook's (or other make) mouse tooth hemostatic forceps, which can be gotten at any surgical supply house for $1.25. Snap them on the inlay and you can hold it in any shape desired. Also, let your assistant turn a stream of cold air on the inlay while grinding and it remains cool. The assistant and cold air has been a great help to me at the chair by keeping the bur cool while cleaning out cavities.

And while you are buying your hemostatic, also buy a five-pound can of surgeon's green soap and use same for moistening felt and brush wheels in polishing plates. The remainder may be used for washing the hands. Once you have used this soap you will never go back to any other. It is not only cheaper, but cleanses and softenes the hands much better.

How I make a sprue wire for holding and removing inlays: Take a German silver wire and flatten the end with a hammer; now trim off the edges until the flat part is only as wide as the thickness of the wire; now hold the wire in your pin vise, catching close to the flat part, and with a pair of pliers twist the flat part to form a screw, point the end with a file and you have a sprue wire that will hold.

Do not warm the wire, but insert by a pushing twist, thus screwing the sprue into the impression. Blow a stream of cold air on the impression and your wire will hold.

Credit good qualities, debit bad ones and strike a balance,—but run from the perfect man.

# A STUDY OF THE CUBIC CAPACITY AND SUPERFICIAL AREA OF THE MAXILLARY SINUS.*

BY VIRGIL LOEB, A.B., M.D., D.D.S., ST. LOUIS, MO.

THE maxillary sinus (antrum of Highmore), on account of the close relationship which it bears to rhinology and stomatology, perhaps has been more closely studied than any other of the accessory sinuses of the nose. It has been known for a long time that this sinus is pyramidal in shape; that the base is directed toward the nasal fossa and the apex is directed toward the malar bone; that the apices of the roots of the upper second bicuspid and first and second molar teeth often lie very close to the floor and sometimes perforate it; that the sinuses vary in shape and size in different persons and even on different sides of the same person.

Clinical observation has shown that the maxillary sinus is subject to diseases which have their origin, not only in the nasal cavity, but also in some of the other accessory sinuses and in the teeth.

This cavity has been studied *in situ,* from an anatomic standpoint, by many men, but few have attempted accurately to reproduce the sinus in some concrete form and make observations of it in this manner. Some have determined the cubical capacity of several pairs of these sinuses and were forced to destroy the heads in making the observations, but, so far, no report has been made in the literature of the superficial area of the sinus.

The report here presented is the result of a study made on the maxillary sinuses in which I have determined the cubic capacity and superficial areas of twenty-one pairs without destroying the original heads. This work is based on the method used by H. W. Loeb[1] in studies of the sphenoid sinus, presented before the Third International Laryngo-Rhinological Congress at Berlin, August, 1911.

## FORMER METHODS OF OBTAINING CUBIC CONTENTS

Brühl[2] describes the method first used by Siebenmann on the maxillary sinus. It is the same as that which Hyrtl used on the labyrinth and is known as the corrosion method. He used a metal which solidifies after being injected into the sinus. The surrounding parts are then destroyed by maceration, the cast of the sinus in the substance used remaining intact. Quicksilver was also injected into the sinuses and *x*-ray pictures were taken to show the size and shape of the cavity.

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*Read in the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession, by special arrangement with the *Jour. A. M. A.*

[1] Loeb, H. W.: Ann. Otol., Rhinol, and Laryngol., March, 1912.

[2] Brühl, Gustav: Zur Anatomie der Nebenhöhlen der Nase, Berl. klin. Wchnschr., 1900, No. 41.

Brühl used the method which Katz employed on the labyrinth. He filled the sinus with Wood's metal, which melts at 65 C. (149 F.) and which consists of:

| | |
|---|---|
| Lead | 8 parts |
| Zinc | 4 parts |
| Bismuth | 15 parts |
| Cadmium | 3 parts |

He then by some process, not described, rendered the bone transparent. In this way a clear view of the sinuses could be obtained, *in situ.* He then removed the casts and obtained the volume by noting their displacement in water. His results from observation on twelve heads were as follows:

| Head | Cubic Capacity in c.c. | Head | Cubic Capacity in c.c. | Head | Cubic Capacity in c c. |
|---|---|---|---|---|---|
| 1 | 16.6 | 5 | 14.1 | 9 | 2.9 |
| 2 | 14.1 | 6 | 8.1 | 10 | 4.5 |
| 3 | 11.7 | 7 | 10.5 | 11 | 9.4 |
| 4 | 8.3 | 8 | 11.2 | 12 | 9.8 |

The general average was 10.1 c.c.

These observations are very important, but naturally lose much because of the necessity of destroying the specimens in order to remove the casts.

Braune and Clasen[3] report measurements of four pairs of maxillary sinuses, the casts of which were made by the corrosion method. Their results are as follows:

| Head | R. L. in c.c. | Average in c.c. |
|---|---|---|
| 1 | 12.5, 11.6 | 12.05 |
| 2 | 11.2, 13.3 | 12.2 |
| 3 | 11.5, 11.7 | 11.6 |
| 4 | 17.3, 18.2 | 17.7 |

General average 13.38 c.c.

## MATERIAL

The heads used in the study here presented were preserved by injecting a 50 per cent dilution of liquor formaldehydi through the carotid; they were decalcified by soaking in a 3 per cent solution of hydrochloric acid for from three to five months. They were then cut horizontally in sections about one inch thick by means of a very sharp knife. These heads are from the Anatomical Department of the St. Louis University. All were heads of adults, and in no instance has it been possible to ascertain any history of the individual.

## METHODS FOR MAKING PLASTER CASTS AND THEIR GROSS APPEARANCE

The portion of the sinus lying within the adjacent sections was filled with soft plaster-of-Paris which when hardened was removed and the adjacent portions united with a thin layer of very soft plaster. This finally resulted in a complete cast of each sinus.

The plaster casts, forty-two in number, representing twenty-one heads, give a clear idea of the size, form and irregular contour of the sinuses. These casts are mounted in pairs and show the relation of the right and left sides.

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3. Braune and Clasen: Die Nebenhöhlen der menschlichen Nase in ihrer Bedeutung für den Mechanismus des Riechens, Ztschr. f. Anat., 1877.

The right and left of each pair of sinuses are more or less symmetrical, but vary in size. They are roughly triangular in shape with the apex posterior, and with all the walls practically triangular except the internal, which is more or less quadrilateral. While the two sinuses of one head usually are similar, they differ materially from those of any other head.

### CUBIC CAPACITY

The measurement of the displacement of water resulting from the immersion of a body in water gives the volume or cubic capacity.

Since these casts are made of a porous material, they were first allowed to remain for several minutes in melted paraffin so that the interspaces might be made impervious to water. After this the cubic capacity was ascertained volumetrically as follows:

| Head | Right in c.c. | Left in c.c. |
|---|---|---|
| 3 | 8.0 | 7.5 |
| 4 | 24.8 | 24.5 |
| 5 | 24.5 | 19.2 |
| 6 | 16.8 | 13.0 |
| 7 | 13.9 | 14.5 |
| 8 | 7.0 | 4.9 |
| 10 | 10.2 | 10.0 |
| 11 | 14.5 | 15.2 |
| 12 | 10.0 | 7.2 |
| 14 | 13.0 | 14.8 |
| 15 | 13.0 | 9.6 |
| 16 | 4.5 | 4.8 |
| 17 | 12.0 | 8.0 |
| 18 | 11.5 | 4.8 |
| 19 | 12.5 | 18.5 |
| 20 | 14.9 | 15.2 |
| 22 | 14.7 | 8.5 |
| 28 | 11.0 | 9.0 |
| 29 | 8.5 | 7.5 |
| 30 | 18.3 | 15.0 |
| 31 | 9.5 | 6.2 |
| Average | 13.02 | 12.85 |

The general average was 12.94 c.c.

These results show the extremes to be head 16 right, 4.5 c.c., and head 4 right, 24.8 c.c. The average, however, of the right side is very near that of the left.

### SUPERFICIAL AREA

Adhesive plaster as used by H. W. Loeb, in connection with the superficial area of the sphenoid sinuses, was employed in determining the superficial area of the maxillary sinuses. A strip equaling 25 sq. cm. (5×5) was placed with the adhesive part down, on a small plate of glass, without stretching. With a sharp knife pieces were cut and fitted on each cast until it was entirely covered, care being taken that the pieces did not overlap.

It is safe to say that this method is not subject to an error of 2 per cent; in fact, it is more than likely that there is not more than 0.5 per cent of error.

The results in square centimeters are as follows:

| Head | Right | Left |
|---|---|---|
| 3 | 25.9 | 25.2 |
| 4 | 52.3 | 48.4 |
| 5 | 51.3 | 45.8 |
| 6 | 43.1 | 37.0 |
| 7 | 34.2 | 37.7 |
| 8 | 27.7 | 21.2 |
| 10 | 29.0 | 29.7 |
| 11 | 35.1 | 39.9 |
| 12 | 28.3 | 22.4 |
| 14 | 35.2 | 35.0 |
| 15 | 33.1 | 28.6 |
| 16 | 12.1 | 16.3 |
| 17 | 30.0 | 25.0 |
| 18 | 34.2 | 16.5 |
| 19 | 31.0 | 40.0 |
| 20 | 33.1 | 33.1 |
| 22 | 36.9 | 27.3 |
| 28 | 29.1 | 26.3 |
| 29 | 25.9 | 25.9 |
| 30 | 41.4 | 38.1 |
| 31 | 27.4 | 21.0 |
| Average | 32.91 | 30.43 |

The general average of all the sinuses is 31.68 sq. cm., showing a marked uniformity in the two sides. The extremes are head 16 right, 12.1 sq. cm. and head 4 right, 52.3 sq- cm.

537 North Grand Avenue.

### ABSTRACT OF DISCUSSION

Dr. G. V. I. Brown, Milwaukee, Wis.: We often do not trouble to remember that the nasal accessory sinuses are receptacles which may harbor microorganisms and thus make it possible for infection to take place at any future time. We should appreciate the great need of association with those who treat the nose in order that no factor may be overlooked which otherwise might lead to the detection of nasal accessory sinus disease. It is important for us to endeavor to learn why such great differences in the size and form of these sinuses occurred; to discover, if possible, any factor that may have been at work which might have been controlled at an earlier stage.

Dr. Eugene S. Talbot, Chicago: Twenty-five years ago I did a good deal of work along this line. More than half the antra had septa in them, some one, two and three which extended nearly to the roof of the upper part of the cavity. None of them were completely bridged across, there being always an opening between these partitions from one to the other. It was interesting to see that the two sides were unlike and that the size differed. This work was done by sawing into the antra and making measurements and by visual examinations. The antra extend often away beyond the last molar tooth, which is an important point in the treatment of this disease.

Dr. G. V. I. Brown, Milwaukee, Wis.: I have demonstrated, by preventing the growth of the maxillæ in dogs, that I could produce an enlarged maxillary sinus, which is unusual in dogs. Similar conditions in human beings undoubtedly produce the same result, and are doubtless in a measure responsible for some of the unusually large maxillary sinuses shown in Dr. Loeb's collection.

Dr. Virgil Loeb, St. Louis: Regarding the form of the nasal cavity in relation to the arch, I wish to say that these specimens are from heads selected at random from the anatomic department of St. Louis University, and for this reason, of course, nothing was known of the history of the cases. As it happened, there were no particular pathologic conditions around the mouth or nose, with the exception of a deflected septum here and there, and enlarged turbinates. There was nothing particularly unusual in them, and I should say that they vary in size and shape as the antra of those present in this room would probably vary. I think these illustrations prove that the size of the head and mouth does not have a great deal to do with the size of this particular cavity.

So far as the treatment is concerned, my ideas have not changed materially on seeing how enormous these cavities can be. I have always thought that the treatment of empyema of the antrum should be largely through an opening into the nasal cavity, with an additional opening through the mouth if necessary, but essentially the opening into the nasal cavity. If an opening has to be made, I prefer the nose to the mouth. I should say that we see 10 or 15 per cent more cases of infection of the antrum from the nose and by way of the other accessory sinuses than from the teeth.

**Dr. J. Head**, Philadelphia: As to the size of the skull, while it is interesting, I think we all know that the mouth has little to do with it, owing to the fact that the size of the intermaxillary bone varies according to the proper relation of the teeth during the formative period.

## DENTAL PHYSIOGNOMY—THE DENTONOMIST.*

BY DR. T. L. SYDNOR, DANVILLE, VA.

The term *dentist,* in German, means literally *tooth carpenter. Dental surgeon* is defined by our collegians as "one who devotes himself to the study and treatment of the diseases of the teeth and their connections."

*Dentonomy* means *tooth-law*—Dens Nomos. The dentonomist is one who has a practical knowledge of this law in all its bearings upon and relations to the human body, mind and character.

To the popular mind, dentistry may be very satisfactorily defined as tooth-preservation, tooth repair, tooth construction and tooth destruction.

### AS MECHANIC

The practitioner deals often with tissue which is inert, inactive and non-recuperative. The materials used are entirely foreign to the dental substance, and not assimilative. They have no natural physiological restorative properties. There is no vital organic union between the organ treated and the material applied. We occupy, therefore, a position in the field of medico-surgical practice which is unique in that the great healer, Nature, refuses its aid, leaving us, as mechanics, almost wholly prosthetic in our materia medica. In almost every department of the curative art the practitioner's medicines are used to eliminate diseased conditions in order that Nature may restore normal functions. Every so-called remedy applied by the general practitioner is a destroyer of tissue, either healthy or unhealthy. Nature must do the rebuilding for him. New nerve cells, new muscular fibre, and, to some extent, new osseous tissue may form naturally, that is, through natural processes when the field has been placed by the physician in a sanitary condition. On the other hand, the dentist who is to be designated in this paper as *the Dentonomist,* when he finds it necessary to use destructive treatment, must be mechanically prepared to supply his own constructive or restorative ingredients. Thus far, then, the dentonomist is a builder.

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*Read before the Virginia State Dental Society, 1912.

### SURGEONS

*These* mechanics are also surgeons—dental surgeons. Every act of surgery is a mechanical operation, and every such operation is more or less the skillful guiding of one's muscles or hands.

Theoretical knowledge, trained by daily practice into the fingers, should result in the very best form of *common sense,* the true definition of which is *brains in the fingers,* or the *know-howing.* You may not vote that word into your dictionary, but the fact remains that the more gray matter you inject into the working parts of the human machine the more common sense there will be exhibited. By *know-howing,* then, I mean knowing and doing.

Theoretical knowledge of the anatomical and physiological make-up of the human organism cannot succeed in the profession without digital wit. The *knowing* must be in the fingers.

### PHYSICIANS

But the surgeon must be more than a skilled mechanic. He must be more than a wise surgeon. As *physicians,* we must know how to aid Nature and what to expect of Nature in her turn. Nature has her laws and the physician has his limitations. In our medicina are found the most potent and death-dealing drugs, and in their application they come into contact with not only sensitive but vital parts. We are neither eye doctors, nor ear doctors, nor nose doctors, nor throat doctors, but each one of these organs should have its separate specialists.

We stand at the very center of all these organs, with the respiratory and digestive added, each and every one opening into the oral cavity. So nearly do these organs touch us that the laity speak of the eye-teeth, wisdom-teeth, stomach-teeth, etc. If required to treat these parts when diseased or abnormal, we must know what effects our medicines may produce upon their organisms. The varied and complicated diseases of the soft tissues, in and around the dental structures, often require tedious treatment and oft-repeated applications and remedies which must be used with the utmost caution and intelligence—Mechanic, Surgeon, Physician.

We are also

### ARTISTS

At whose hands is required a product which must perform all the useful functions of Nature, and so resembling the natural as to be hidden in its own imitation. Works of art usually are intended for exhibition, for inspection and criticism. In many cases ours so replaces or restores Nature that there is no suspicion of the artificial. We say, then, *"Ars est celare en Artem";* that is, our art is to conceal the art.

Of course, we are speaking here of our perfected attainment, for it must be admitted that very potent factors force us, too often, to subordinate our knowledge of the true, patients whose estheticisms would have us rival the nose and lip jewelry of the Hindoo, the pecuniary inability of the patient to command the highest type, and lastly neither mechanism, surgery, medicine, nor art, nor all combined have yet made it possible to successfully meet all the demands of our ideal.

With this in view, however, we claim to be laborers in the field of the scientist.

### SCIENTIST

The ancients admitted, as scientists, only the proficients in Grammar, Logic, Rhetoric, Arithmetic, Geometry, Astronomy, and Music. We specialize none of these medieval seven, but while old things have not yet passed away there has been a mighty expansion, and scientific principles do prevail and pervade our practice.

> "Good sense, which is only the gift of heaven,
> Though no science, fairly worth the seven."

We stand upon a pyramid which has its first, or foundation stone, laid by a mechanic in the cement of common sense. Its next carved by the armamentarium of the surgeon. Its third compounded from the prescriptions of the physician, and its apex fashioned by the artist, while each block in this pyramid is laid under the light of science. Claiming an acreage in all these fields, we are yet, in a most practical sense, Specialists. With some knowledge of everything, we are thus better prepared to understand everything about some one thing. From our mental storehouse we cull out and concentrate, condense, specialize what is known as Dentistry. I prefer to capitalize all these acquirements and deal with the product as the stock of the

### DENTONOMIST

After narrowing ourselves down or narrowing up to the definite term Dentonomist, we find it comprehensive enough to claim all the talent and all the skill and common sense we can command. When we have followed Lavater and the later writers on physiognomy, we readily concede all that is claimed in their most fascinating theory. It is exhibited even in the brutes. The horse shows his temper or disposition through his nostrils, his eyes, and ears. The muscular expressions of the dog are even more marked than those of the human. While the human can control his muscles in order to deceive, the dog tells the whole truth with every muscle from the end of his nose to the tip of his tail. When he shows his teeth and brings his tail to a horizontal, we read his mind and know what to look for, and when he pricks up his ears and wags his tail he is just as sincere.

Gall and Spurscheim have left us their Phrenological Chart, which is beautifully significant in its object, physiological in its premises, and to some extent correct in its psychological conclusions, but their chart can touch only about one-third of the bumps and convolutions of the brain, therefore is quite incomplete.

We have claimed much for the Dentonomist. We do not claim that he is a phrenologist, a physiognomist, or a psychologist, but we do affirm that if these professionals would consult the Dentonomist as to the mental, physical and pathognomic indications of the teeth, they would be able to arrive at much more intelligent diagnosis.

Just so surely as the teeth of the brutes indicate their herbivorous or their carnivorous habit, or the beak of the bird its bug-eating or its grain-eating proclivities, and so on through all the list, so surely do the individual human teeth, by their setting, their shape, shade, or density, show innate characteristics—mental, physical or pathological. Note that these symtomatics are congenital, fixed, and not the result of passing emotions playing upon the muscles nor under the control of the will, but inherent, and yet unknown to the possessor nor suspected by the uninformed.

How often does the healthy-looking, beautiful young woman or girl present herself to the dentonomist, who is shocked to find a strongly marked consumptive diathesis? In another case, symptoms of loathsome disease yet undeveloped, while others indicate imbecility or weakness of mental calibre.

We, as practitioners, are familiar with the various temperaments referred to as sanguine, bilious, choleric, lymphatic or phlegmatic, nervous, melancholic, etc., so decidedly marked upon the teeth, and while we do not claim that an abstract examination of the teeth will point us unerringly to character of mind or body, but from their peculiar formation, position and composition they are more symtomatic of certain innate physical constitutions and mental characteristics than any other evidence within our reach.

We readily couple the firmly set, broad-shaped, square antagonism with a temperament full-blooded, strong-willed, healthy, sanguine. They are of yellowish shade and our best samples, coupled with health and vigor; and, when noted in connection with auburn hair, indicate a degree of voluptuousness.

The Lymphatic class, delicate in structure, difficult to treat, very susceptible to caries, are so named from the temperament of which they are characteristic. Pale features, thin-blooded, sometimes heavy body with not enough muscle to carry the burden. While there is an expression of inactivity on the face, prudence and sound judgment are indicated.

We find a class which is termed scrofulous. These describe a broad and usually well-shaped arch not unlike the sanguinous, but of a muddy, uninviting appearance. The fissures between the cusps of the teeth are deep and invite decay. They are characteristic of the disease known as torpid-scrofula.

We find another class, teeth beautifully white, rather long, small, and set between ruby lips. We quickly diagnose innate consumption. We name them the Phthisis-Pulmonaris. The temperament is bright, vivacious, hopeful, but we find both the teeth and their owner liable to sudden collapse.

The muffled tones of the weak-minded or idiotic result from the lingual encroachment of the bicuspids, together with a flattened palatal arch.

Thus far the teeth have appealed to the dentonomist from their prenatal or congenital standpoint, but their prognostic value does not cease entirely at this period. During infantile life, while the unerupted teeth are in a formative stage, they are very sensitive to any cutaneous affection and retain these marks through life, indicating not the fact alone, but bearing the date or age at which the disease occurred. The parent is often surprised when reminded by the dentist that her child had a more or less severe case of measles, scarlet fever or some other epidemic disease at some specified age.

We have but scanned the facts anatomical, facts physiological, facts pathological and psychological so familiar to our profession and yet ignored by the general practitioner. Yea, more—these facts are primarily the knowledge of the dentonomist and not more ignored by than unknown to the M. D. profession. We would, therefore, have our fraternity uncover the facts and turn the light so plainly into the minds of the physical and mental healers—whether special or general—that they will be constrained to help us to teach the people that we are here not only to labor for ourselves and the existing generation, but that our mission antedates even the conception of the unborn.

# THE PREVENTION, BY ANTICIPATION, OF MALOCCLUSION AND DEFORMITIES RESULTING THEREFROM.*

BY DR. J. A. BURRILL, CHICAGO, ILLINOIS.

IN TAKING upon myself the office of advisor to the general practitioner regarding his duty, in the anticipation and prevention of the future developmental ills of the mouths and features of his young patients, I feel that I have shouldered a heavy responsiblity, yet one too important to shirk or neglect: and while the general practitioner cannot be blamed for the facial deformities that exist from malocclusion, yet it is to him we must look for the prevention of these conditions in the future, because it is he more than all others whose privilege it is to see most of these little patients

It may seem unnecessary to say at the outset that the general practitioner must be perfectly familiar with the normal before he may hope either to anticipate or prevent the abnormal, and strange as it may seem it is nevertheless true that the profession as a whole does not comprehend the full meaning of the term "normal occlusion."

Knowing Dr. E. H. Angle's definition of occlusion "as the normal relation of the inclined planes of the teeth when the jaws are closed," is not sufficient in this case. One must have in his mental eye something more than a picture of the teeth nicely aligned and perfectly interdigitated. He must see with it a complicated mechanism of forces exerted in every direction by the inclined planes acted upon and in part controlled by another complicated muscular mechanism which is put into action by the functions of mastication, deglutition and respiration, and which controls the moulding of the bones of the face as it develops. He must be able to determine the contour of the dental arch in its relation to the type and structural architecture of the individual as a whole.

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*Read before the Northern Ohio Dental Society, 1912.

Commencing with the individual just at the completion of the development of the temporary dentition, let us see what we should find. A nice, well-rounded dental arch of no particular type whatsoever, with all the teeth in approximal contact.

Up to this stage, about the age of three or three and a half years, barring accident or congenital trouble, we may say that almost all children are dento-facially normal. Up to this stage malignant influences in the development of the child's face are extremely hard to detect though they be present. Furthermore, very few of you see many patients as early as this. But if you are to anticipate and prevent malocclusions and deformities you must educate the parents to understand that in order to give the children the best possible dentistry (and that is preventive dentistry) your supervision must begin at this early age and be continuous. If malignant influences are present they will about this stage, or very soon, begin to show unmistakable symptoms which you all should be able to detect.

Some of the earliest symptoms seen are: *first*, contraction of the arch, due to abnormal muscular stress, with a narrowing and loss of the interproximal spaces in the incisor region; *second*, loss of mesio-distal tooth width, due to decay and the developing influence of the first permanent molar; *third*, evidences of malicious habits; *fourth*, abnormal frenum labium.

The first and most common cause of maldevelopment at such an early age is that of nasal disorder, causing improper breathing. This is brought about by enlarged adenoid and faucial tonsils. Let us for a moment consider how these disorders bring about maldevelopment. The patient is forced to breathe through the mouth. This in itself prohibits perfect physical development to a degree, but more important than this is the disturbance in the balance of the muscular forces that control the moulding of the bones of the face. In a normal face in perfect repose the teeth are not in occlusion, but the muscular pressure of the cheeks and lips on the outside of the teeth and jaws pressing inward is counterbalanced by the muscular pressure from the tongue on the inside pressing outward. When mouth breathing is established this balance of the muscular forces is disturbed, particularly in the upper arch, by the removal of the tongue pressure from the inside. Hence we have taken away the tongue pressure from the inside entirely and some of the lip pressure from the incisors and left the inward pressure from the muscles of the cheeks undiminished, or perhaps slightly increased, from their extended condition when the jaws are separated in mouth breathing.

Now we have the cause and its manner of working, what is the result of its influence? The jaws, particularly the upper one, are inhibited in their lateral development and become narrow. The influence of the upper jaw on the lower, through the forces of the inclined planes, hinders the lower jaw in its development or makes it seek a distal relation to the upper jaw to accommodate its increased width.

The most important symptom we have in the mouth of a child from the age of four to six years is the relation of the temporary incisors to one another. Beginning very soon after the completion of the temporary dentition in a normally developing jaw, spaces will begin to appear between the incisors and gradually increase in size until by the time these teeth are to be shed there should be almost, if not entirely, room enough for the permanent teeth that are to follow. Why should this be? At this stage the crowns of the permanent incisors are their full size. The process which contains them must be large enough to give them room without causing the loss of mesio-distal contact. If this mesio-distal contact is lost, Nature is deprived of a cog and her development will be deficient by just that much. How often we see children at the age of five and a half or six years with these spaces lacking. The mother thinks that those teeth are perfect. She cannot yet see what is happening up in that process where the permanent incisor crowns are being forced by their limited space to rotate and overlap each other, and she is horrified when you mention the fact that those arches should be widened. But, gentlemen, just as sure as day follows night, rotated permanent incisors will follow such condition, and Nature cannot help herself. Now comes your duty to assist Nature by forcibly widening these arches. It will even then depend largely on how early you have detected this on-coming evil, and you will often find when you have widened the arches sufficiently before the eruption of the permanent incisors, that they (the incisors) still insist in erupting in torsal occlusion. But despair not: you have done what is best because you have helped Nature complete a normal-sized arch, and the rotation of the incisors later is a small thing beside what would in all probability have developed had you not lent your timely aid. One thing in favor of your interposition at this time is that the temporary cuspids and molars are still in condition to withstand the force necessary in widening the arches, and possible injury to the permanent teeth is very much lessened. Right here we might apply the old saying that "as the twig is bent so the tree inclines"; as you mould the temporary process so will the permanent process be inclined.

Aside from all this we must not forget the systemic influence brought about by these same causes of mouth breathing. Besides destroying the function of the nose entirely, and marring the development of the face, they soon reach the functions of the ears and eyes; and, going still farther, the infected secretions from the diseased adenoid and tonsils is being carried into the system through the stomach and intestines and no doubt gives rise to many of the rheumatic and gouty conditions we see about us in the adult.

Second in importance in the cause of malocclusion and facial deformity is something which you are well equipped to control—loss of tooth substance by decay in the molar region. As you all well know, in the loss of mesio-distal tooth width, or of a tooth itself before the proper time for its natural loss, the space closes up. How? Just back of the second temporary molar is the developing first permanent molar forcing its way up into position. This loss of mesio-distal tooth width we have spoken of allows this first permanent molar to erupt without doing its whole duty to the rest of the arch. Normally, it should, in forcing its way into position, carry all the temporary teeth forward by pushing one against the other, but in the loss of some of its blocking, as it were, it has to close up the lost space before its efforts are communicated to the whole length of the arch. In other words, Nature has lost one of its building blocks and cannot build according to contract and specifications. This brings about two other things, namely, abnormal occlusion of the first molars with its detrimental influence, and the putting of more work on some other developing tooth than it can do by encroaching on its allotted space, and so on. As you can see, a train of evils has started that may end anywhere or may never end.

Third, pernicious habits, thumb-sucking, showing itself in two protruding upper centrals, with perhaps a slightly opened bite; tongue-sucking, showing an open bite, or perhaps from the manner of holding the tongue on one side while sucking, the upper molars are forced into lingual relation to the lowers; lip-biting, showing itself in retruded lower incisors and sometimes retruded lower jaw, with perhaps a slightly open bite also.

These habits rarely continue until the eruption of the permanent teeth. How, then, can they produce malocclusion in the permanent dentition? The protruding temporary incisors of the thumb-sucker distorts the moulding of the process which contains the permanent teeth and their paths of eruption. Hence, also, the mallocked molars of the tongue-sucker, and the retruding incisors of the lip-biter. The open bite, found with all three, is indicative of inhibited alveolar development and cannot but have like influence on the permanent dentition. In other words, Nature cannot and does not regain development that it has once lost any more than you can regain lost time.

We are to some degree dependent upon our judgment in determining the effect of any one cause or in summing up just what the combined effect of a number of causes, working together, might be.

In cases of the age we are now considering we need pay little or no attention to the type of face on which we work. We may depend upon Nature doing its whole duty if we will but correct and direct the interfering influences. One thing which we must study very carefully is the proper time and order for the loss of the deciduous teeth. As you all must know, the time of eruption, of the permanent teeth particularly, varies from one to three years in different individuals, and good judgment and not text-book order must be relied on, thereby foreseeing and forstalling malocclusions produced by too early loss or too long retention of deciduous teeth. The *x*-ray aids very much in forming correct opinions in these cases at times. But we must not depend too much upon the *x*-ray, for in spite of the greatest care distortions cannot be eliminated.

Fourth in the causes of malocclusion is the abnormal frenum labium often found, causing separation of the upper central incisors and occasionally the lower centrals as well. This condition exists during the temporary dentition and persists in the permanent one as well. I have never been allowed the care of such patients early enough to operate for correction before the loss of the temporary incisors, but I see no reason why the operation should not be perfectly successful at such a time.

Now that we have anticipated many, if not all, the influences that tend to produce malocclusions and facial deformities, what is our duty in preventing them as they arrive? You cannot operate on adenoids and enlarged tonsils, and it is useless to tell the patient how to breathe properly unless the tonsil condition is corrected, but you can teach the parents the evil effects thereof and insist on their correction by those qualified to do such operations. But why does this duty devolve on us? Is not this the sphere of the medical practitioner? I answer by asking, Do many mothers seek the services of the physician under such conditions before a child is ill and confined to the house or bed? But do they come to us before the child is suffering from toothache, or had become hideous to look upon from deformities of the mouth? I have but one answer and that is, It is our civic duty to teach the parent in the home and the children in the schools those things regarding oral conditions which they themselves should know, and, by compulsory dental and medical inspection of the schools and free dispensaries for those who cannot pay, prevent abnormal muscular forces from causing mouth breathing, and enforce oral hygiene and thereby banish malocclusions and facial deformities from our midst.

## ENVIRONMENT

**A wrong environment can slay the soul that does not fight. It can suffocate all aspirations that do not insist on breathing freely. It can stab to the death all ideals that will turn their faces and run from ridicule. It can poison all love that is not strong enough to absolve those who would drag life down to their level. It can even bleed the great of their greatness, unless their blood is warm enough to heat other blood to the pace of its current. The soul that would know freedom, happiness and fullest life must escape from the wrong environment, or fight sturdily and overcome it.**

**Therefore, if the environment be narrow, let us delve deep for hidden treasures; if the environment be shallow, let us search the heights for stars; if the sky be cloudy and the ground hard, let us visit with the wind the far away fruitful valleys, and bring home rich, succulent nourishment to tide us over the period of famine; if the environment be foul, soiling our fairest garments, let us become gardeners, and cherish flowers that bloom best in the mire; if the environment be drowsy as a poppy patch of luxury, let us tear up the roots that are nearest, so that we may set our feet on rough and rugged earth; if the environment be cramped, let us, like Sampson, break down the pillars of the Philistines at our own peril.**

**For though the environment be narrow, shallow, dark, foul, dull or cramped, it can be changed by independence and sympathy on the part of those who fight all alone, but who live, love and suffer with all others.** —Marguerite Ogden Bigelow.

# THE SPEECH RELATION OF CLEFT PALATE OPERATION.*

BY GEORGE V. I. BROWN, M.D., MILWAUKEE, WIS.

THE surgery of cleft palate in the course of its evolutional progress through constantly changing, but, as we believe, steadily improving technic and operative methods, has finally become established on a sufficiently firm basis to warrant the assumption that any palate fissure may be closed by a surgical operation. This progress has also brought with it a realization that merely covering the roof of the mouth by carrying tissues across the palate fissure, even though union may be ever so perfectly secured, is not of itself sufficient to insure good speech results. More healthful nasal and oral conditions may thus be secured. The effect of improved respiration, together with the beneficial influence of local healthfulness on general health, may always be expected, and these results alone are well worth all that undertaking the operation implies without consideration of speech improvement. Beyond this, individuals requiring this treatment may be assured that they will speak more easily and even more clearly than before operation. Between these results and the perfect speech that is so desirable there is a wide division, and in this intervening doubtful area may be found many widely different more or less influential factors, each of which should receive due consideration in determining both the surgical methods and prognosis.

When we remember that speech is governed by the sex, character, mental capacity, training, state of mind, nervous conditions, general bodily health and past and present development influences, it should bring a realization that only one of all these factors, that of sex, lies completely beyond the possibilities of therapeutic or surgical improvement. Even the sex influences on the sound of the voice may be surgically altered, though its improvement may be questionable. Under some conditions, exceptions must also be made with regard to character, mental capacity and prenatal developmental influences, because these are sometimes beyond control according to our present knowledge. All the other influences become more and more susceptible to improvement as advancement in our understanding of psychopathic, neuropathic and other pathologic states increases the range of recognized opportunities in the direction of speech control. The causes of defective speech, according to Cohn, are: stammering, stuttering, nasal defects or malformations of hard and soft palates, deaf-mutism and defects of speech due to diseases of the central nervous system. Ballinger's enumeration is as follows: defects of speech of nasal origin, defects of speech of epipharyngeal and faucial origin; defects of speech of lingual origin; defects of speech of laryngeal origin; defects of speech of thoracic and ab-

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*Read in the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession, by special arrangement with the *Jour. A. M. A.*

dominal origin; deaf-mutism; defects of speech due to malformations of palates, and defects of speech of central origin.

In my own work on "The Surgery of Oral Diseases and Malformations" I have grouped the foregoing classifications of defective speech causes into nervous, anatomic and mechanical influences. Radical divisions of this character, it will readily be understood, cannot arbitrarily be insisted on, because factors belonging to each one of these classes are inseparably dependent on and associated with those that might be classed in some other division. Congenital absence of the sense of hearing or defective brain development or nervous affections common to defectives, in so far as they may prevent or militate against speech, are for the greater part beyond any surgical or medical control. Certainly their control lies outside the field of oral surgical treatment except such nervous affections as may be benefited by the treatment of buccal conditions. All methods that may be helpful should be employed when indicated to assist such individuals toward the establishment of more stable conditions of the nervous system, in order that every possible assistance of this nature may be given speech function.

In undertaking the treatment of these cases, the most difficult feature often rests on the decision as to whether the condition is one favorable for improvement or due to causes that cannot be corrected. To those who have not seen large numbers of harelip and cleft palate cases, and who may therefore be unfamiliar with the frequency of the occurrence of other defects among such individuals, it may seem like a confession of ignorance for me to state that notwithstanding the unusual opportunities for such observations that many years of practice limited to this surgical field has given, I constantly find it more instead of less difficult to determine satisfactorily just how much or how little the factors, other than those which anatomic defects represent, may be influential in each particular case.

All who have had experience in the treatment of defectives of any character will readily appreciate the importance, when applied to the treatment of one form of speech defect, of the notable fact that all degrees of speech defect, of the notable fact that all degrees of speech imperfection are found among such individuals even when their mouths appear to be quite perfect. A more general realization of this feature of speech consideration may be facilitated by calling attention to the wide differences of sound and pronunciation in speech among all people whether normal or otherwise. Obviously, the surgical closure of a palate fissure cannot be expected to overcome a speech defect, the underlying cause of which is some factor other than those which concern the physiologic action of the parts, as influenced by the anatomic defects.

Therefore, when there is a combination of influences of this character associated with cleft palate, the improvement of speech may be expected only in so far as these other imperfections, in addition to the anatomic defects, may be overcome. The influence of wrong speech habits which can be benefited only by patient systematic training after the palate fissure has been closed I have fully described in previous articles published in *The Journal*[1] and elsewhere, in my work on oral surgery, the surgery of oral diseases and malformations, but I call attention to this feature of the subject in order that my full appreciation of this aspect of the question may be understood since it is with other factors that the present consideration is more particularly concerned.

Preliminary considerations having thus included and recognized the significance of all factors comprehended within the wide range of influences that may make for or against improvement of speech in these cases, there seems, therefore, little danger that I may be misunderstood when I state that study and experience have convinced me that in most cases the correction of defects by postoperative speech training and the rapidity of speech improvement under all circumstances will be accelerated in proportion as the results of our surgical operations in both uranoplasty and staphylorrhaphy more nearly approximate the normal in the reproduction of bone and soft tissues in the palatal region. This study includes experience in the speech-training of patients whose palates have been closed according to the methods that I employ, as well as other methods, and of patients whose palates were not fissured but who had defective development of the hard palate, although the palatal vault was perfectly covered with soft tissue and the velum apparently complete and whose speech defects were often worse than those of patients with open palate fissures. With this end in view, I have endeavored to ascertain exactly what measure of normal development might be secured by the methods of uranostaphylorrhaphy that are chiefly employed, by conducting a series of experiments on dogs during the past two years. I was enabled to do this through the courtesy of Parke, Davis & Co., who placed their laboratory for pathologic research at my disposal, and through the valuable assistance of Dr. N. S. Ferry, who is in charge of that laboratory.

Everything was accomplished in the most painless manner possible. A few minutes before the operation each puppy was given an injection of chloretone so that when brought into the operating room it was in a state of absolute muscular relaxation, and so profoundly insensible to nerve stimulation that it was impossible for it to suffer even the fear and discomfort which might otherwise have been incidental to the administration of ether, under the direct influence of which the operation was performed.

These experiments are still in progress, but I believe that sufficient evidence has already been secured to warrant a report at this time with deductions therefrom applied to the subject of our consideration.

The recognized distinct types of operation for palate closure are as follows:

Compression by crowding together the segments of a palate divided by fissure in such a manner as to force the parts into contact, as recommended for young infants by Garretson, Brophy and others.

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[1] *The Journal A. M. A.*, Feb. 1, 1908, p. 342.

Turning over the flaps by reversal of the soft tissues on one side of the palate surface and attachment to the opposite side, according to the practice of Lane for young infants, and the late Dr. Ferguson of Chicago for persons of more advanced age.

Fracture of palate bones. The method of sawing through the palate bones from behind forward, fracturing with forceps, and wiring in such a manner as to approximate the bony fragments sufficiently to bring the soft parts together, was devised by Ferguson and earnestly advocated for many years by Mears of Philadelphia, who did so much for the advancement of oral surgery. After having become practically obsolete, the method has recently been improved by Roe.

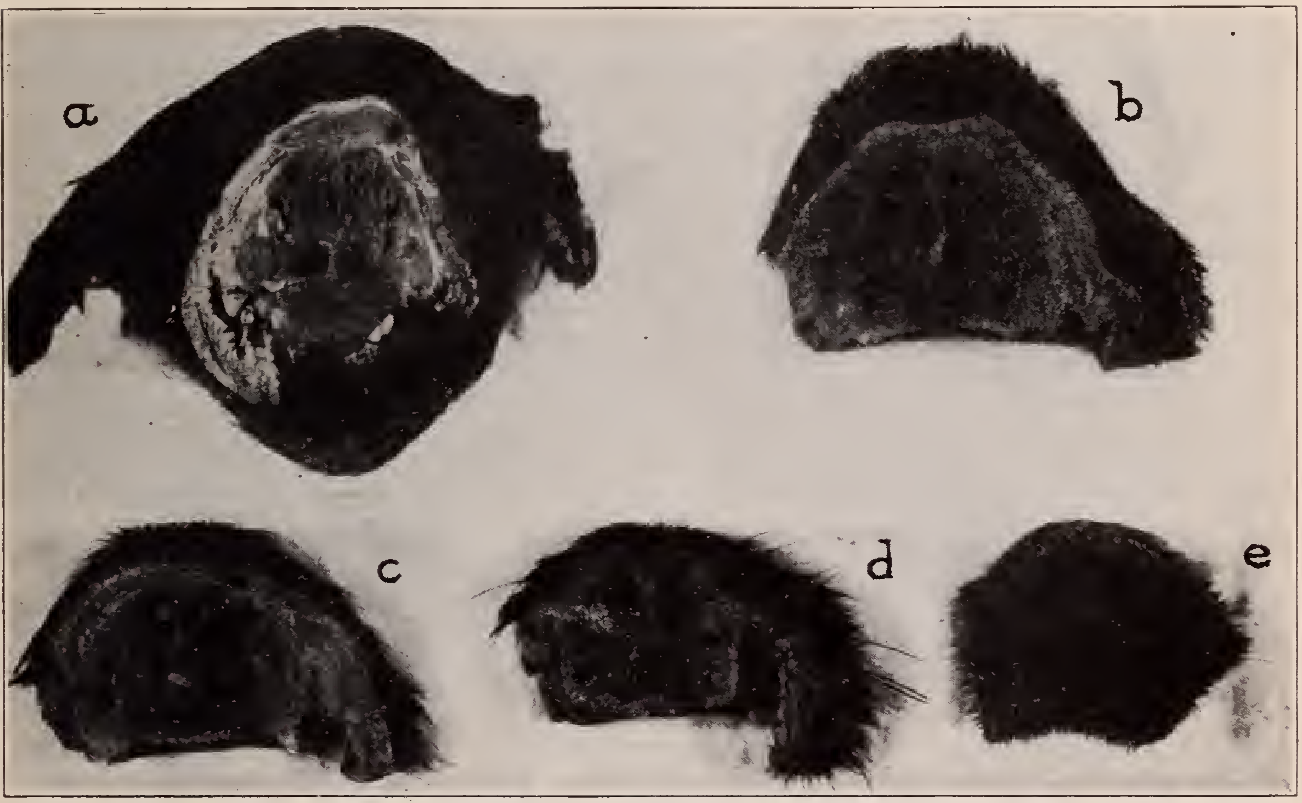

Fig. 1.—Sections from the head of a normal puppy 6 months old.

Anterior end of flaps detached. Detachment of a flap from the anterior portion of the palatal mucoperiosteum and carrying it across the fissure, as in the Davies-Colley operation.

Mucoperiosteal flaps. Fissure closed by lowering the palatal arch and sliding the flaps across the bone surfaces in such a manner as to bring them in contact in the median line, a method chiefly due to von Langenbeck and improved and altered from time to time by many other operators.

## PALATE COMPRESSION

I have long had reason to believe that this method should unhesitatingly be condemned, because compression so exerted necessarily contracts the parts in such manner as to narrow the nares and crowd the erupting teeth out of place or totally destroy at least some of them. This leads not only to later disfigurement, through disarrangement of the dental arch, but also to loss of growth and development of mouth, nose and face, so that when adult life is reached the best speech is impossible, and the fullest possibility of good appearance prevented.

Unfortunately it sometimes happens that these cases, when apparently successful, and so reported, in later years prove to be more seriously damaged than the unsuccessful ones in which the parts have drawn apart at an early date, and thus, to some extent, overcome the contraction.

Numbers of children and young persons who have had palates closed in early infancy by direct compression are living examples of the truth of this statement. Deviated nasal septa, contracted nares and diseases attendant on these conditions, extending in various degrees throughout the extent of the nasal mucous membrane, affections of the middle ear, mastoiditis with associated deafness, contracted palates with teeth developed toward the central portion of the mouth, with almost hopelessly deformed dental arches and insufficient space for tongue movement in speech, fully attest the truth of this conclusion.

The evidence of the sections through the heads of puppies at six months old shows with absolute perfection exactly what does occur in alteration of intranasal form, when growth of the upper maxillary bones is so arrested as to interfere with the normal width across the palate, which, whether it occurs through adenoids, enlarged tonsils, mouth-breathing, the malocclusion incidental to irregular dental arches, or through forcible compression and the introduction of retaining wires in closure of cleft palate or otherwise, inevitably produces, in greater or lesser degree, the same results and the invariable chain of pathologic conditions which affect not only the local structures but general health and development as well. The sections shown in Figure 1, a, b, c, d, e, and Figure 2, a, b, c, d, e, were cut from the heads of the control pup and one of several puppies eight weeks old, which were operated on by passing wires through the maxillæ from a point above the roots of the teeth on one side above the palate and out at a corresponding point on the opposite side. These wires were secured by silver plates clamped with shot so arranged on the inside of the tissues of the cheek as to interfere as little as possible with muscular action. The palates were compressed sufficiently to force the upper teeth inside or in lingual occlusion with the lowers, so that the upper and lower jaws of these puppies were placed in about the same occlusal relation that exists with growing children whose bicuspid teeth meet the corresponding lower teeth in lingual (inside) occlusion instead of buccal (outside) or normal occlusion. Not nearly so much force in compression was used as would be necessary to close a palate fissure according to the method of this character which was formerly widely practiced on infants with cleft palate. One puppy was kept without operation as a control and all were allowed to develop until they reached the age of six months. This, it was estimated, would approximately correspond to the age of a child eight years old. The puppies were then killed, the heads frozen and sections cut through the nose and upper jaws at short intervals.

In the course of this experimental work on dogs, other symptoms were noted in the puppies that were similar to those found in children with high contracted but otherwise normal palatal vaults whose upper jaws are similarly, even though more naturally, constricted. The dogs operated on developed a high degree of nervousness which corresponded to the nervous condition of such children, and inasmuch as the nervousness of the dogs was apparently caused by the effect of buccal and nasal conditions, it offered a fair explanation of the clinical experience that such children almost invariably become less nervous after an expansion appliance has been inserted and a measure of maxillary and nasal relief thus afforded.

The almost perfect resistance of the pharyngeal and bronchial mucous membrane of healthy dogs to the action of pathogenic bacteria has been proved by experimentation; this is lost when the air passages are obstructed from any cause. The marked susceptibility to infection thus produced in these puppies was undoubtedly accountable for congestion of the lungs found in one of the experiment puppies and other evidences of disease in others. This was exactly in accordance with the frequent colds, bronchitis, and tendency to pneumonic affections that are characteristic of all mouth-breathing children.

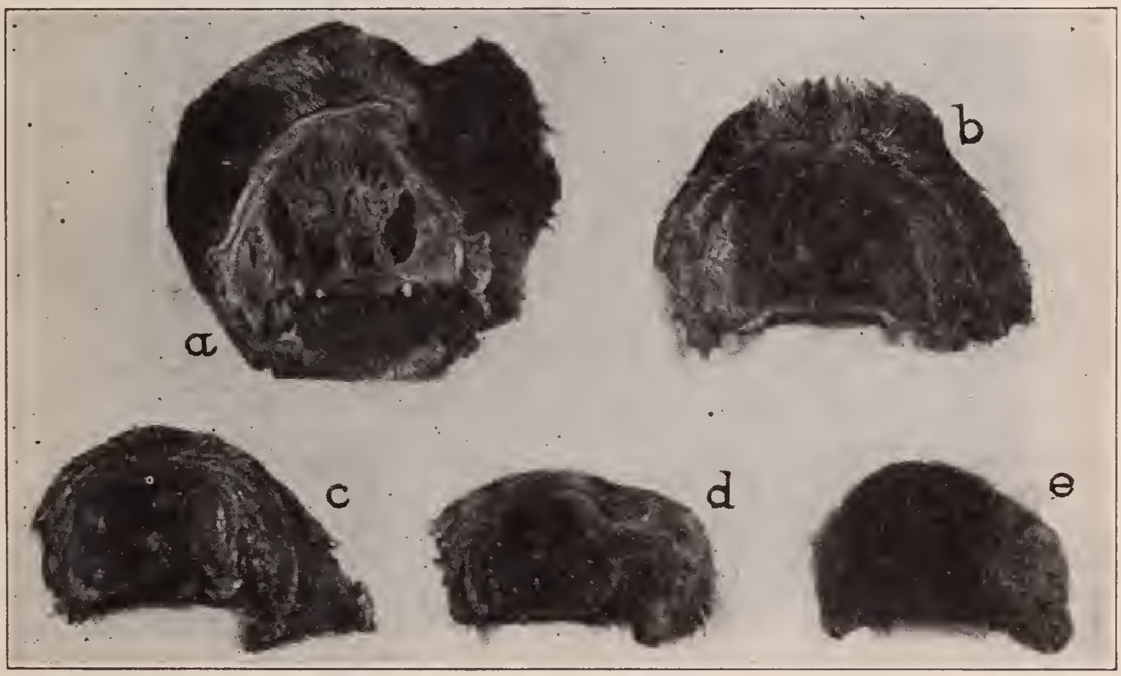

Fig. 2.—Sections from the head of a puppy 6 months old, with jaws arrested in development across the palate by wiring at 8 weeks old. All these sections show plainly the effect of restricted jaw growth in reducing the size of the nares. Section c, cut through the point at which growth was almost entirely prevented, shows almost complete nasal stenosis. Section b, marked deflection of the nasal septum, and Section a, both maxillary sinuses greatly enlarged.

The enlarged maxillary sinuses of the experiment puppies, when compared with the slit-like openings of the normal dog, are also in accord with the clinical evidence that individuals affected by high narrow contracted palates and nasal defects almost invariably have enlarged and (as is now becoming better understood) diseased nasal accessory sinuses also. Post-mortem bacterial examinations of such sinuses, and the frequency with which they have been found to contain pneumococci, have emphasized the pathologic importance of these findings.

### FLAPS INVERTED

The second type of operation was tested by cutting sections of bone from the palates of puppies, thus converting them into cleft palates. The fissures in some of these animals were closed by making incisions along the alveolar border on one side down to the bone, raising the mucoperiosteal tissue of the palate from the external border toward the center, reversing it, sliding the border under a mucoperiosteal flap raised by separation along the border of the fissure of the opposite side and suturing the parts in this position, the purpose being to follow, as nearly as possible, the methods of Lane and Ferguson. The fissures in other puppies were closed by freeing the anterior end of the mucoperiosteal flap with a broad posterior pedicle, reversing and suturing it under a flap similarly raised on the opposite side which was left with the mucous membrane in its normal situation (Figs. 3 A and 4 A) as in the Davies-Colley operation. Due allowance must be made for the difficulties attendant on dog operations of this character, particularly the disadvantages of postoperative treatment; nevertheless, the jaws of these puppies as they were after the healing process was completed and with the soft tissue stripped to expose the bone fissure demonstrated clearly that there is no evidence whatever of bone reproduction (Figs. 3 B and 4 B). It therefore seems reasonable to conclude that this type of operation is objectionable, because through the disturbance of the natural anatomic arrangement of the tissues, occasioned by turning the periosteum upside down, bone-growth does not take place as it might if the periosteal surfaces were merely moved across and brought together in natural position. Therefore, the result of all such operations, even though successful in giving a covering to the palate, is to cause formation in that region of more or less thickened fibrous tissue. Such tissues

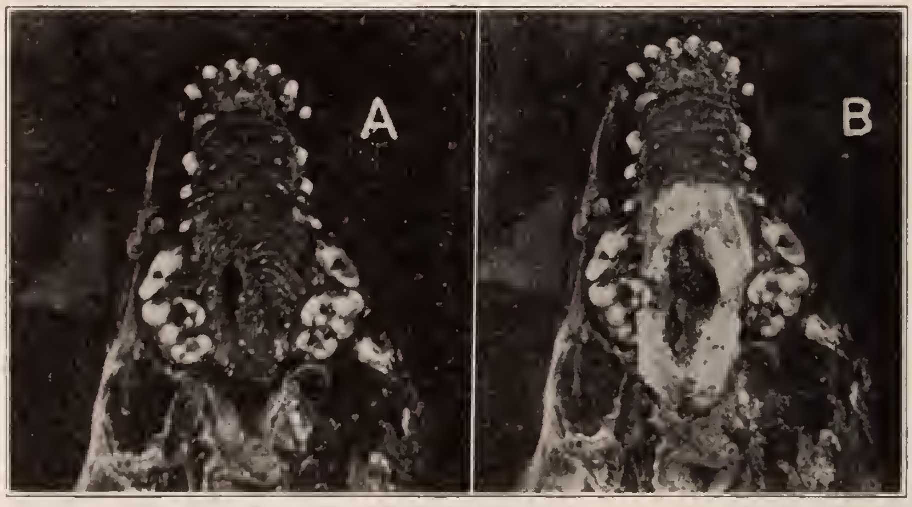

Fig. 3.—A, the result of operation on a young puppy in closure of a palate fissure cut through the hard palate in imitation of the form of a congenital human cleft palate as described in the text; B, head of same puppy with the mucoperiosteum removed, showing no bone development in the region from which the bone structure had been removed.

may yield to normal expansion as growth proceeds, and thus not seriously contract the width of the palate or nose, but when developed, the part cannot have the firm, resounding properties of a bony palate, nor will it have the fixed resistance to the attachments of the muscles that will be necessary for proper speech function.

The importance of this finding can best be appreciated by consideration of cases, previously referred to, of defective speech without apparent palate fissure. Many examples could be cited of cases in which there was not and never had been fissure through the palate, beyond in some instances a bifid uvula, and yet these individuals had all the speech defects of patients with complete fissures through both hard and soft palates and their inability to profit by speech-training seemed to be fully as great.

Careful examination disclosed in every instance that though union of the soft tissues of both the hard and the soft palates was complete, there had been an arrested development of the palate bones which left the hard palate short, or with the outlines of a notch in the median portion, which would have been a cleft palate had it not been covered by soft tissue. Such cases are not generally recognized and not infrequently more or less long-continued treatment has been attempted in an effort to stimulate the action of the palate muscles by the use of electricity or otherwise, because the speech defect has been regarded as due to partial paralysis of these muscles. As a matter of fact, the real cause is a deficient palate bone development whereby the fixed attachments of the muscles of the velum palati at the hard palate are so altered that proper function in its lowering and raising is impossible, and for this reason the development of the soft palate as a whole is incomplete.

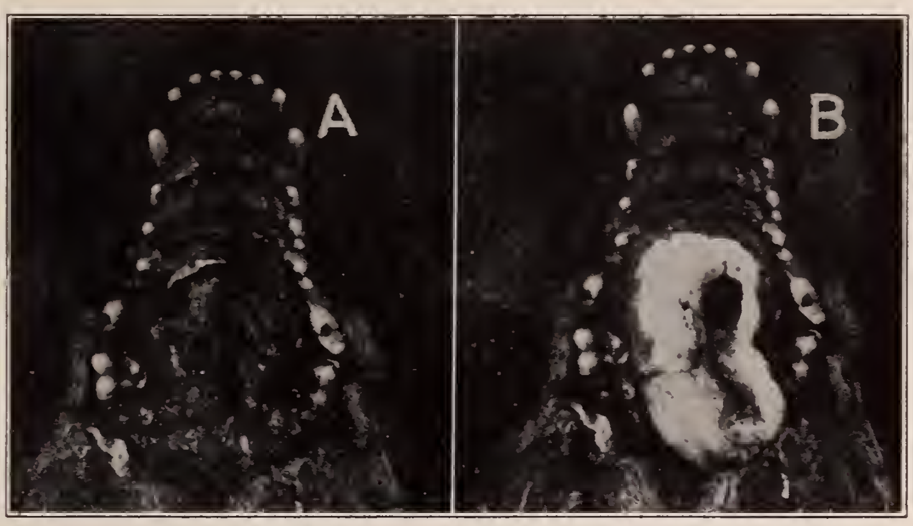

Fig. 4.—A, the result of operation on a young puppy in closure of a palate fissure cut through the hard palate in imitation of the form of a congenital human cleft palate as described in the text; B, head of same puppy with the mucoperiosteum removed, showing no bone development in the region from which the bone structure had been removed.

Operation on a number of these patients for correction of this palate condition has led to considerable improvement, but the trouble is so insidious and yet so difficult to overcome that any operation which at the outset contemplates producing a similar condition should be avoided.

## OTHER DEFECTS

Other speech defects that may be considered to be directly due to postoperative imperfections, such as deformities due to injury of the premaxilla or its misplacement in operation, to nasal defects that should be avoided during hairlip operations, the velum too short or too tightly drawn or so stiffened by scars after staphylorrhaphy as to be incapable of the necessary free movement, lip deformities, occasioned by imperfect operations or other causes, which affect speech, and deformities of the dental arch or other factors that antagonize correct psychologic action in such effort—all these defects, which might properly be described in detail under the title of this article if the time limitations permitted, must be postponed for future consideration.

It should be borne in mind, however, that all of them may be benefited by corrective operative treatment, but their prevention should be the dominating thought in determining operative methods. This can only be accomplished by avoiding all unnecessarily forcible treatment in early infancy, and in the selection of the type of operation to be performed, it should be remembered that every effort must be made to retain all tissues in as nearly their normal situation and relation as may be compatible with the requirements of the conditions governing the closure of the palate fissure. This necessarily implies systematic treatment from the very earliest period of infancy if possible. Each operative procedure should lead step by step to the next in order that each may be more easily and perfectly accomplished.

445 Milwaukee Street.

## ABSTRACT OF DISCUSSION

Dr. M. I. Schamberg, New York: For a long period of time the main question in connection with palate work was to be able to close the palate, and everyone worked with that end in view, and often disregarded the ultimate speech results. I feel confident that this helpful piece of research will be looked to as one of the greatest steps in advance.

Dr. M. H. Fletcher, Cincinnati: I would like to ask Dr. Brown how much training the patient may need in learning to speak? How perfectly may these cases be restored, and do the patients really learn to speak perfectly? I suppose in most of these operations the patients have to be drilled in learning to speak. Assuming that an operation has been performed on a child of 10 years, does the patient learn to use the muscles and produce perfect sounds as we know them?

Dr. G. V. I Brown, Milwaukee: Dr. Fletcher's question covers the whole field of speech-training, and the real basic purpose of the work as we undertake it. I generally prefer to get the palate closed before opportunity has been given to acquire bad habits of speech; if possible, before any adverse changes have occurred in the muscles, the nasal accessory sinuses or the face. When such persons have reached a sufficiently advanced age, wrong speech sounds are almost impossible to overcome. Most cleft-palate patients know the nature of their defects only through other people. They are not directly conscious of their abnormal voice sounds. I have met this difficulty by taking phonographic records of the speech in such cases and when the graphophone spoke back to them so that they could hear their own voices in that way, the effect was the same as another individual speaking. They then recognized the defective sounds. Some of the patients whose palates I have closed in infancy, and who are now grown up, have speech that is not entirely satisfactory—not nearly so much so as some who have been operated on later in life. Some people pick up sounds quickly; they seem to have a natural activity in the use of the tongue, as some people have of the fingers, and learn very readily. I have known people fully developed, whose names I could not understand as pronounced by them when they first came, and in two years have met these people after operation, and they spoke very distinctly. I would not leave the impression that one is not cognizant of their defects of speech, but these people go out into society, take their natural parts in conversation and have interests in life that were not possible for them before. In time they become useful people. Then again, there are others who do not seem to improve at all. It is impossible to avoid the speech-training feature in these cases, because the success of palate work really depends on that result. I think, however, that the speech-training idea has been exaggerated. In other words, the speech of these patients has probably been bettered in proportion to the degree of approximation of normal anatomic conditions without which no amount of training could be effective. The purpose of the experiments on dogs was to demonstrate as nearly as possible just what the results of uranostaphylorrhaphy really are when performed according to the different methods, and to determine which one more nearly approximates natural conditions. The patients that give me the most trouble are those who have never had cleft palate and yet have many speech defects that are the same as those indicating that deformity. In such a case, under an anesthetic we examine the nose, throat, palate and pharynx very carefully and try to determine exactly what the physical defects are; we also endeavor to ascertain if the speech imperfection be due to some central condition governing the control of the parts or otherwise. Naturally, in all cases the success of treatment must depend on these two conditions.

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## The Northern Ohio Meeting

A splendid program as to both papers and clinics has been arranged for the meeting of the N. O. D. A. at the Hollenden Hotel, Cleveland, June 5, 6 and 7, and every ethical dentist in the district is urged to attend. Members require no urging; they will all be there.

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## THE COST OF DENTAL GOODS.

BY W. J. BRADY, D.D.S., KANSAS CITY, MO.

IT IS BELIEVED by most dentists that next to diamonds and millinery, dental goods are the most expensive things to be found. It is true that dental goods cost considerable money, but most of the high-priced ones —especially those of mechanical nature—are not high-priced at all, but actually cheap. The real cost of an article depends on what is received for the money paid out, not just the amount it takes to buy it. Therefore we repeat that most of the expensive dental goods are cheap, even if they are costly.

There are three things that make dental goods cost money: their superlative quality, the comparatively small number of buyers, and the carelessness of dentists in both buying and paying for their supplies. But few realize the superior quality of dental goods. It is a very mild statement to say they are surpassed by very few manufacturers; to say they are not equaled or even approached in quality is nearer the truth.

This can only be fully appreciated by being compelled to buy and use the tools and materials offered in other lines. A real comparison is a revelation.

Compare, for instance, an automobile engine with a modern dental chair of the best make. The great exactness of the engine is loudly advertised by the manufacturer; "every part made to within one one-thousandth of an inch of exact size." Sounds like pretty fine work. Yet among good mechanics one-thousandth of an inch is considered a rather coarse measure, and in the dental chair there are parts ground to within one five-thousandth of an inch: And when it comes to hand-pieces, one ten-thousandth of an inch is all the variation allowed from standard size. There is as much machine work on a dental chair as on a four-cylinder engine, and the chair is made with greater exactness, yet the chair sells for less money than a good engine.

An ordinary screw-cutting lathe with the necessary chucks for the usual run of work costs from \$90 to \$125. Yet it takes less than half the work and material to build the lathe than a dental chair, and the exactness of the lathe is much less. A precision lathe is about the only piece of machinery that ranks with a dental chair in exactness and amount of work to build; the precision lathe costs from \$300 to \$400, with ordinary equipment. To fit up a machine shop with precision machinery equal in variety and quantity to a well-equipped dental office would cost nearly three times the money, and the quality of product would not be one particle better.

Outside of precision lathes and such machinery, the quality of dental goods is not equaled at any price. Automatic screw machines, milling machines, and turret lathes—all fine things—are built bigger than dental machines, but they are merely bigger, and not better. The exactness of manufacture of these things does not begin to compare with chairs, dental engines, or hand-pieces. And when it comes to electric motors for dental lathes or engines, with their instantaneous stop, start, and reverse, and their silence and smooth running, and excellence and completeness of all equipment, there isn't another thing made in the entire line of electrical manufacture to be classed with dental electric goods. Such goods can't be bought elsewhere at any price, for they simply are not made.

It would naturally be supposed that jewelers' and watchmakers' lathes are about as exact bits of machinery as can be built. They *are* exact, but not more exact than dental hand-pieces, and many of the imported lathes not so good either in finish or temper as the ordinary hand-piece. And they wear out faster than a good hand-piece, for they are not so carefully tempered. When it comes to the thousand and one little tools that look so fascinating spread out all over the watchmaker's bench, none of them have the quality of steel nor finish of excavators or pluggers. In fact, steel goods of the temper and quality of dentists' hand instruments are not made in jewelers' and watchmakers' lines.

When it comes to burs, no such instruments are made outside of dental supplies. Small twist drills and milling cutters for jewelers' lathes come the nearest in size and exactness of manufacture, but the quality is so inferior to a good dental bur that comparison is laughable. Yet the price is higher than for the burs. Think of getting burs with blades cut mathematically exact, each blade at a carefully calculated angle, and each exactly the same height, the edges sharp as a razor, and hard enough to cut steel, and yet so nicely tempered that breakage is almost *nil,* and the shanks all within one five-thousandth of an inch of the same size, all for a dollar a dozen. Similarly shaped cutters are made for milling machines, only larger—which means they are much easier to make—yet the cheapest of these is nearly a dollar apiece.

And so with many other steel goods—forceps, contouring pliers, rubber-dam punches, automatic pluggers, broaches, clamps, separators, etc.—goods of equal quality are not made outside of dental supplies. Surgical goods are a good example; surgical knives are often "pot-metal"—will not hold an edge at all; forceps bend or break on the first hard usage, saws supposed to be the finest possible are inferior to a good carpenter's saw. Example after example in numerous lines of goods might be cited, all showing inferior temper, finish, or wearing qualities, as compared with dental goods, and nearly all at higher prices.

Dental furniture is no exception to the rule. There is no work put out superior to that of the American Cabinet Company, even in the finest bank fixtures, or most exquisite house or office furniture. Compare the finest roll-top desk you ever saw with a fine dental cabinet with all its numerous smooth-sliding drawers, these with their partitions, compartments, and various receptacles, all finished just as smooth and nice inside as outside. Note the amount of work put on the cabinet to make all these; see how every edge is smoothed down, every corner rounded, every place finished. Compare the wood, either solid mahogany or selected oak; the dental cabinet is the equal of the finest. Then compare the price. The dental cabinet, with equal wood, superior workmanship, and lots more of it, isn't so high after all! For any solid mahogany roll-top, or quartered-oak buffet, or even a fine dining table, will cost as much as the cabinet, and the amount of work on the cabinet is probably three times that of the other, too.

Dental goods of quality can never be sold for little money. They cost money, because it takes money to make them; and while they are expensive, they are at the same time cheap. Let us be glad that a "competition for excellence of product rather than cheapness of price"—to reverse Josiah Wedgewood's famous remark—still characterizes our best manufacturers, and we hope it will never be otherwise. And let dentists congratulate themselves that they are able to buy better things than any other profession, without exception. While the high quality of dental goods makes them costly, inferior quality makes them still more costly.

Superior quality accounts for most of the cost of dental goods, yet the limited number of buyers also helps keep the cost up. There are approximately 35,000 dentists in the United States, and about 50,000 in the world. Therefore, a dental manufacturer knows he cannot exceed this number of customers at the utmost, while many other manufacturers have the possibility of millions of customers. This limited capacity necessarily adds to the cost of dental supplies, for the laborer is always worthy of his hire. Goods must be sold at a profit, or they will not be produced.

There is another element of cost, however, that rests directly with the dentists themselves. Professional men are notoriously negligent of their financial affairs, and while dentists are no worse than the rest—and possibly not so bad as some—yet this disregard of finances makes their dental goods cost them many a pretty penny extra. This does not apply to all, of course, for there are dentists who are good business men as well as good dentists; these make a neat little saving of about thirty-three and a third per cent. annually on their dental goods, all by the simple process of applying ordinary business methods to the buying and paying for the same.

It is an axiom of business that the small buyer and the slow payer always pay the long price. The cost of doing business is proportionately greater in small lots than large, all of which is and must be added to the cost of the goods. Most dentists disregard this long-established business feature entirely, and string their buying out into many small purchases, where they might easily make a few large purchases and get a much better rate.

It is the quantity purchased that lowers the cost. And the quantity rate is always as advantageous to the seller as to the buyer—there wouldn't be any quantity rate unless it was. Dental dealers offer a saving of about ten per cent. on really moderate quantity purchases, and this discount is certainly worth looking into. Few investments can be made to net this much and still be safe. It is safe to say no good buyer in other lines would overlook such an attractive discount, yet many dentists do, when they could just as easily bunch their orders and make money. Many a dentist grabs at a mining stock or oil well proposition that only *promises* ten per cent., and then neglects a perfectly safe thing in his own business that *pays* ten per cent.

When the deposit-in-advance method is used, the cost of goods is still further reduced, and this method is just as safe as putting the money into the First National. There has never been an instance where a dentist has lost his money by this plan. It is conservatively estimated that the ordinary practitioner will "turn his money" three times a year in this way, and his savings will amount to fully thirty-three and a third per cent. annually on his investment. What other proposition offers anything like this? And with safety, too.

When the extraordinary quality and limited sales of dental goods are considered, the cost is really small. And when these savings are available by the mere process of using ordinary business sagacity in buying, and following established business procedure in paying the bills, there can be no reason for howling over the cost of dental goods.—*Western Dental Journal.*

# ORAL SURGERY.*

### BY DR. J. A. BOLARD, PHILADELPHIA, PA.

IT IS NOT my purpose to present a learned or scientific treatise, but rather the experience of one who, for more than thirty years, has more or less successfully attempted to practice our chosen profession. If by so doing I can lend encouragement to some of the younger men of your association and fill them with a stronger determination to personally grapple with the problems which frequently are presented to them, I shall feel amply repaid for my thousand miles of travel.

As before stated, I claim to be of your own brethren and kin, and began my studies of dentistry in the office of Dr. Maxwell, at the corner of Chestnut and Water streets, Meadville, Pa. From there I went to Davenport, Iowa, and entered the employ of a Dr. Marshall, who was an M.D. and a skillful and daring operator in surgery as well as dentistry. While in his employ I was often thrown upon my own resources and responsibility, and I there boldly attempted operations which now cause me to pause and well consider. It is said that the good Lord watches over those who haven't brains enough to take care of themselves, and it must have been His guiding hand that saved me from my rashness, but I there learned a self-reliance which has often stood me well in hand in the years that followed.

After coming to Philadelphia I came under the instruction of the great James E. Garretson, a nobler or more talented man God never made, and he devoted his life to the alleviation of human suffering without the expectation of fee or reward; he demonstrated, both by precept and example, that it was the logical duty and privilege of the dentist to perform any and all operations in and about the oral cavity; he maintained that the dentist should rely upon himself and never call upon others for help or abandon his patient until he had exhausted every resource of his own. He taught that the performance of one operation gave us confidence to attempt another; that skill was only to be acquired by frequent practice, and that nothing was difficult to him who knew how; to be a good oral surgeon one should be well grounded in regional anatomy, and here as well as elsewhere, if you remove the cause of disease Nature will bring about resolution.

It does not require half the skill to remove a tumor, open the antrum or excise a necrosed bone that it does to fill a tooth or treat a case of pyorrhea. The one purpose of this paper is to show that most of the minor surgery we are called upon to perform is not nearly so formidable on close acquaintance as it seems at a distance, and if the young practitioner will thoroughly prepare himself and have just a little courage, he will soon have just as good a percentage of successes to his credit as many of those who now pose as *specialists.* In country towns and small cities nothing will add to our reputation or renown so much as a few cases of minor surgery.

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*Read before the Lake Erie Dental Society, 1912.

To take up in detail the many forms of oral diseases which might be alleviated by surgical treatment would occupy far more time than could be reasonably allotted to a paper like this, and I shall, therefore, confine myself to a few of those which are located upon or adjacent to the alveolar ridge. Difficult or abnormal dentition is often met with, and the amount of ignorance displayed by parents, and, I am sorry to say, often by physicians, is really appalling. Superstition often plays its part and mothers, who otherwise seem to be well informed as to the needs of the normal child, hold up their hands in holy horror when you suggest the use of the lancet. "Mother never did so; she says take a thimble and rub them through" is the usual response to your suggestion, never stopping to consider that a more barbarous or irrational procedure could not be imagined. Not all infantile disturbances can be traced to faulty dentition, but from the fifth to the twentieth month it is more likely to be the case than all other causes combined. The second molar, which appears about the twenty-fourth month, usually causes little disturbance. Increased temperature, excessive flow of saliva, a desire to put everything in the mouth, diorrhea and convulsions or spasms are some of the symptoms. A free and frequent use of the lancet is all that is usually required to bring about the desired relief. I have never seen a case where any injury was done by too early or too deep an incision. Where too early, a cicatrix will form, which will more easily break down than the original tissue, and one cannot cut too deeply, as the underlying tooth will prevent any possibility of going too far.

The child is not apt to be half as much frightened or make half the fuss as the parent, and the almost instant relief that is afforded will amply reward you for your trouble. The bugbear of "second summer troubles" would often disappear by the use of a little minor surgery.

The eruption of the permanent teeth rarely gives us any trouble except with the cuspids and third molars. I believe the true orthodontist objects to any extraction to improve the articulation, but I frequently resort to it because the parent is unable or unwilling to bear the expense of expanding the arch. Again our services are often not called for until the patient has reached an age when such a procedure is extremely difficult. My son has recently completed one of the most difficult cases I have ever seen, for a young man of twenty years, but it took two years of constant and persistent effort on the part of both patient and dentist, and I don't believe it paid for the labor. The extraction of the first bicuspids would have simplified the work and reduced the time 75 per cent, and the patient just as well served.

I have frequently had presented to me cuspids which have made no attempt to erupt till late in life, long after all the others had been lost and replaced by a full artificial denture. One such case, a Mr. D., aged fifty years, who had had several full upper dentures made for him, which he had been unable to wear because of what he called a "tumour" in the roof of his mouth and which he had been advised never to allow anyone to touch, as dire results might ensue, came to me after several dentists had attempted to bridge over the protuberance by making a depression in the plate; soreness always following and making it impossible to get sufficient adhesion to retain the plate in position. I diagnosed the case as an impacted cuspid imbedded in the palate plate of the superior maxillary bone and advised immediate extraction. This he positively declined and tried to induce me to make him a denture without removing the offending tooth. I refused and tried to show him that it was not a serious or even painful operation and that a successful denture could not be made without its removal. He went away but in about a month returned and, with much fear and trembling, consented to its removal. I injected a solution of cocain, and after locating its position, made a deep incision parallel with the tooth and it almost fell out itself. I then made him a denture, which he wore with the greatest comfort for five years, when, to my surprise, he returned with precisely the same condition on the other side of the median line. I had a good deal of trouble in removing this, as it was firmly imbedded, and I was fearful that in my attempts to grasp it I might push it through into the nasal cavity. After its removal he replaced the original denture and has had no further trouble. This occurred about ten years ago.

I have had a great many similar cases and have invariably found the root to have a decided curve or crook. I have never found one that I could not get or produced any bad results in the extracting. With the lower third molar I have not always had such good results, and I have found them more difficult to remove when deeply impacted than any operation I have ever attempted. I usually administer ether and, with an alveolar bur, cut away the bone around the tooth before I attempt its removal. It is true bone you find here, and the cutting is hard and sometimes slow; the hemorrhage is not great and a little patience will usually be all that is needed. If, however, I am so unfortunate as to break the root in my attempts at its removal, I let it remain and do not attempt to go further. I have never known one to give further trouble, and a few months will bring it to the surface, where it may easily be removed. On the other hand, I have seen the most serious results follow the attempts to get a small piece deeply impacted. In one instance one of our specialists fractured the bone; ulceration set in and the patient nearly lost his life. In another the inferior dental nerve was severed and a permanent partial paralysis of that side of the face resulted.

In exostosis, or hypercementosis, as it is sometimes called, much the same procedure as with the third molars is called for, but we are usually favored by a better location, and the surrounding tissue is alveolar and not true bone and the difficulty is not so great. I have here a few specimens which I present for your inspection.

In implanting teeth I have not had much real success. I have made a good many attempts and in only two cases have I had immediate failure, but none have remained over six years and some not more than one or two years. The roots have become absorbed much in the same manner as a deciduous tooth. In none of these cases have I been able to find a suitable root that had a suitable crown, and with all of them I cut off the crown and replaced it with a porcelain one before implanting. I believe if more care was exercised in shaping the hole, so as to insure a perfect fit for the root to be implanted, we would get healing by first intention and more permanent results would follow. In these days of bridge work and attached plates, there is not much need for implantation.

In replanting teeth I have had better success, and often resort to it when teeth have been accidentally knocked out. My first case of this kind occurred thirty-four years ago. In attempting to extract a first lower molar for a boy 13 years of age, I accidentally threw out the second bicuspid. After removing the molar, I replaced the bicuspid without removing the pulp or even sterilizing it, and, strange as it may seem, it remains there to this day, never having discolored or decayed. Another case was that of a young woman of twenty-four years, a resident of Meadville, who had had left a superior lateral treated by one of the leading dentists of that city, now dead. The pulp had been removed and the canal enlarged and filled with gold, an alveolar abscess resulted with a fistulous opening. Numerous attempts had been made to cure this by removing the filling and treating the canal. As long as it was left open no trouble resulted, but at every attempt to close it the old trouble returned. I was spending my vacation in Conneautville in the summer of 1887, when the case came under my care. After a month's treatment with no better results, I extracted the tooth, and upon examination found that the original operator, in attempting to drill out the pulp canal had drilled an artificial canal parallel with the true canal, to the apex of the root. This artificial canal being larger than the natural one, subsequent treatments were always in the artificial one, which accounted for subsequent failures. I cleaned both canals and filled them to the apex with gutta-percha, and replanted the tooth, and it remained there in perfect comfort until the patient died, about four years ago. Since then I have resorted to this method whenever I have been unable to cure an abscess by other means, and I have never lost a case.

Two years ago this month a boy of eighteen, whose parents live in Pittsburg, while playing tennis, was struck in the mouth and had both upper centrals knocked out, the left upper lateral broken off at the gum line, leaving the pulp hanging to the root. Two days later he came to me to have the lateral root extracted. The lips and gums were so swollen that it was impossible to make an examination, but upon inquiry I got the history of the case, and after a diligent search through his pockets he produced the centrals, together with a knife or two and a few rusty nails and fish hooks. I applied cocaine to the pulp of the lateral and removed it. I removed the pulp from the centrals and filled them with gutta percha, washed out the sockets, and after sterilizing the roots and sockets, replanted them. I made a splint of perfection base plate and ligated it in position. He returned in ten days, when I removed the splint and crowned the lateral. They are doing good service at this writing.

In cases where pyorrhea has laid bare the apex of one of the roots of a molar, I have obtained much relief and prolonged the usefulness of the tooth by amputating the exposed root. About twelve years ago a merchant, aged fifty, for whom I had previously placed a bridge with the right superior lateral as one of the anchorages, developed an alveolar abscess at the apex which quickly degenerated into necrosis and refused to respond to treatment. I amputated the end of the root and carefully cut away the necrosed bone; resolution at once began, and in four weeks was completely healed, and the remnant of the root still supports the bridge in good condition.

A lady, aged about 45 years, living in Camden, N. J., presented herself about five years ago with necrosis at the apex of the right superior lateral and central. I excised the necrosed bone, making a cavity about the size of a chestnut; the ends of both roots were much roughened, and I amputated them. A complete restoration to health occurred in about six weeks and has continued so to the present time.

A Mr. B., aged sixty, in which the left superior maxillary bone was necrosed from the cuspid fossa all the way back, involving the antrum, came to me. In this case the teeth had all been removed some years before. I removed the entire alveolar border, including the tuberosity. This man had had a stroke of apoplexy and his circulation was very poor, and a complete restoration did not take place for six months; three years later he died from another stroke of apoplexy.

A Mrs. A., aged 24 years, was brought to me by her physician, with an epithelial growth about the size of a hazel nut between the right inferior cuspid and first bicuspid; this quadrupled in size in ten days, and, although she was four months in pregnancy, I decided to operate. I removed both bicuspids, the cuspid and lateral, and excised all the alveolus over the space. She quickly responded to treatment, and everything went well for three months, when exactly the same condition appeared on the left side. Owing to her advanced condition, I was fearful of the results of a second operation, and decided to postpone it as long as possible. I superficially removed the growth, but in four weeks it had grown to such a size to prohibit the introduction of any solid food; the mental depression of the patient was great, but after urgent demands of the family and with consent and assistance of the physician, we again placed her under ether, and this time removed all the teeth anterior to the molars and the accompanying alveolar process.

To our great relief, no bad results followed, and in another month the child was born, free from any imperfection. A year later I replaced the lost teeth, with a partial denture anchored to the molars, and it was doing fair service when I last saw her, which was about four years ago.

The last case which I shall present you is that of a diseased antrum. A lawyer, aged 47, for whom I have done dental work for about eight years, came to me in April, 1911, with a soreness in the right superior maxillary region. After a careful examination, I found no external evidence of any trouble. The third molar had been devitalized about three years ago, and was slightly sensitive to percussion. On learning that he found a pus-like discharge on his pillow every morning, I at once decided that he had a diseased antrum, and I advised extraction of the third molar and the perforation of the antral cavity. To this he demurred and told me that two years before he had undergone an operation for a diseased mastoid by one of our medical college specialists, and the recollection of it was still vivid. I did not see him again for three months, when he came in and informed me that he had returned to the college specialist, who, after an X-Ray, had confirmed my diagnosis, but informed him that an operation was unnecessary and that he would treat him through the nares. This he did until around the first of November, by which time the patient had lost forty pounds in weight and was unable to sleep or retain his urine more than an hour at a time. Whenever he desired to stoop over or pick up anything from the floor it was necessary to hold his handkerchief to his nose to catch the flow of pus which was ever present. At this time the patient's wife came to me in great distress and alarm over his condition, and urged me to send for him and insist upon an operation. This, of course, I could not do, but I explained to her as best I could how trivial and painless such an operation was, but how serious the results might be if he further postponed it. This information, I afterwards learned, she carried home with her and a council of war was held that night, for the next day he appeared and informed me that he had just interviewed his specialist, who was now willing to operate, but through the nasal cavity. He also informed the patient that it would be necessary for him to go to the hospital, take ether for the operation, and remain there a week; that his general health was so impaired that he would have to put him on a tonic for a month preparatory to the operation. This was the last straw, for he promptly asked for his bill, which he paid, and came to me and asked for instant treatment. I cocained the third molar, extracted it, and with a surgical bur opened the antrum through the cavity of the palatine root. The whole operation occupied less than a half minute, and was practically painless. To my surprise, there was no flow of pus, but after one or two injections of dioxygen large pieces of cheese-like substance were dislodged, the whole cavity was a solid mass, but once broken up was easily removed. No pus appeared after the third day, and the constitutional functions became normal within a week. In about six weeks entrance to the cavity closed. He is now in first-class working condition, is regaining his lost weight, and says he feels like a new man.

I have gone into the details of this last case at perhaps unnecessary length, but I wish to emphasize what I said in my opening remarks—that the dentist is better qualified for oral surgery, owing to his familiarity with his surroundings, than the general practitioner, and if I have been able to impress any of you with the ease with which most of such operations may be performed, I shall be amply repaid.

In closing, I desire to thank this society for the honor conferred in inviting me here, and I trust that some faint heart may take courage and hereafter perform those operations which he has been sending to the physicians.

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## SUGGESTIONS FOR INSTRUCTION IN GRAMMAR GRADES OFFERED BY ORAL HYGIENE COMMITTEE OF CLEVELAND DENTAL SOCIETY.

### Mouth Hygiene.

### Lesson I.

*Mouth.*.

(a) Use.
    Door through which food passes.
(b) Care.
    (1) Potatoes and all foods cleaned by mother before they are used.
    (2) Dishes, knives, forks and spoons cleaned by mother before they are used.
    (3) Mouth should be kept clean by us ready to receive the food.

### Lesson II.

*Teeth. Use. Chewing.*

(a) Chewing grinds food fine and prepares it for the stomach. The chicken's food is ground in its stomach; the chicken has no teeth; WE must grind food in the mouth.
(b) Chewing mixes saliva with the food in the mouth. Nature demands this.
(c) Chewing food cleans the teeth if the food is not too soft. (Chew the crusts of bread).
(d) Chewing strengthens the jaws and makes them grow.

### Lesson III.

*Teeth. Decaying.*

(a) Apples, fruit, etc., decay or rot if left standing in a basket or on a shelf.
(b) Food left clinging to the teeth or in the spaces between the teeth, decays and causes teeth to decay.

(c) Teeth that are badly decayed ache and cause pain.
(d) Brush your teeth carefully every morning and at night.

### Lesson IV.

*Brush Drills:*

The prime object in cleaning teeth is to reach all surfaces of the teeth. Brush always from the gum to the cutting edge, so as not to irritate the gum by brushing against it or to force debris under the gum. The best way to clean teeth thoroughly:

(a) Brush upper right back teeth outside surface ten times, then the inside surface ten times, then scrub backward and forward on the grinding surfaces ten times.
(b) Brush upper left back teeth outside and inside and on grinding surface the same way.
(c) Brush upper front teeth outside surface, then holding brush pointing into the mouth, bristles up, brush the inside surfaces.
(d) Lower right back teeth outside and inside and scrub grinding surfaces.
(e) Lower left back teeth outside and inside and scrub grinding surfaces.
(f) Lower front outside and pointing brush into the mouth, bristles down, brush the inside surfaces.

After brushing the teeth, the mouth should be thoroughly rinsed with warm water, using the full power of the lips, cheeks and tongue to force it between the teeth.

Any material used to aid in cleaning the teeth, whether tooth powder or paste, should not be gritty. (Do not use pulverized charcoal or pumice stone).

"Precipitated Chalk" is the chief scouring agent in all good tooth powders. It can be flavored with sugar and essential oils to the taste, and a small quantity of pulverized castile soap is beneficial and makes an inexpensive tooth powder.

Tooth pastes differ from powder only in being mixed with glycerine, or some other excipient.

### Lesson V.

*Teeth. Eruptions.*

(a) At six months, baby gets two teeth in front.
(b) At three years, baby has all his baby teeth.

*Permanent Molars.*

(a) At six years, a large tooth comes on each side, back of the baby teeth on both the upper and lower jaws. These are called the first permanent molars. (Permanent means they should last all our lives). They are the most important teeth in the mouth. watch them carefully.

## LESSON VI.

*Incisors.*

(a) Between six and seven years, children lose the two lower front teeth, called incisors, because they cut like scissors. In their place come two big incisors, called permanent incisors, because they are intended to last the rest of life.

(b) Next they lose two upper front teeth, called central incisors (center of jaw) and get two large permanent ones in their place.

Then at regular intervals the other baby teeth are shed and replaced by the permanent teeth.

It is very important to keep the baby teeth till the permanent ones are ready to come in. First, for their use in chewing; second, to keep the space for the permanent ones.

If the baby teeth are lost too early, the space is not held for the permanent teeth and they are apt to come in crooked.

## CLASS II.

### INSTRUCTION FOR OLDER CHILDREN.

*Anatomy of Teeth:*

The tooth is divided into crown and root. Crown—Visible portion after full eruption. Root—Part enclosed in bony process of the jaw.

Outer layer of crown—the hard glass-like part—is called enamel. Under the enamel is a softer structure more like bone, called dentine. Enclosed by the dentine is the pulp, commonly called "nerve," but which is composed of many blood vessels and nerve filaments. The enamel is the hardest substance in the body, and is intended to protect the teeth from wear of mastication and from decay. The dentin is the body of the tooth and gives it strength.

The pulp is the chief source of nourishment of the tooth. In early life the pulp is large and the dentin thin. As one grows older, the dentin becomes thicker and the pulp smaller; for this reason the pulp should be kept alive in order that the dentin may arrive at its full maturity.

*Decay:*

The first process of tooth decay is the destruction of the enamel. Acids disintegrate the enamel.

Acids may be taken into mouth as lemons, grapes, vinegar, or formed by decomposition of foods, such as sugar or starches, or are formed by micro-organisms, which excrete acids.

After the enamel has been broken down, exposing the dentin, dental caries or decay ensues, and if permitted to go on uninterrupted finally reaches the pulp. This is often accompanied by toothache. If the pulp is exposed, it may lead to its death, and a dead pulp may form an abscess, and an abscess may cause the loss of the tooth.

*Prevention of Decay:*

Clean teeth will not decay. The teeth ought to be cleaned after each meal, so as to prevent any acids or foods forming acids from attacking the enamel. If this could be done perfectly, there could be no decay of teeth. But if decay has begun it can and should be stopped immediately by proper treatment.

*Results of Decay:*

Aching teeth, foul mouth and breath, contamination of food, impairment of mastication, faulty digestion, and assimilation and poor health.

## Seeking Aid of Mayors and of Governors

### Educators Desire Community Support in School Hygiene Program

In view of the serious importance of school hygiene to the child, the school, the home and the community, the Organizing Committee of the Fourth International Congress on School Hygiene, to be held at Buffalo, August 25-30, is inviting the attendance, not only of educators, physicians, hygienists and scientists, but also of delegates from all the leading towns and cities, and from the states and territories of this country.

No effective campaign for the extension of modern methods in school hygiene can be carried on without a community backing, announces the Organizing Committee, and one of the prime objects of the forthcoming congress is to secure this endorsement. Letters have been sent to several hundred Mayors, and to the Governors of all the states and territories, requesting the appointment of delegates.

The successful co-operation of all these influences, according to the Buffalo program, will mean the establishing of efficient medical, hygienic and sanitary supervision in schools, giving in return:

For the child: Increased comfort, greater happiness, larger schoolroom success, more safety and greater certainty of future efficiency.

For the school: Fewer absences from the schoolroom, fewer interruptions on account of epidemics, and more satisfactory educational response to class-room activities.

For the home: Less anxiety, less apprehension, fewer doctor bills, less work, more health, happiness and prosperity.

For the taxpayer: A saving by more efficient methods in school work, and also a larger product of active, intelligent, capable individuals, whose influence will be toward the improvement of every phase of community life.

For the community: Healthier and, therefore, more efficient and more prosperous citizens.

For the nation: Results measured in terms of the conservation of human life.

Representatives will be sent to Congress from all the leading nations and from all the leading educational, scientific, medical and hygienic institutions and organizations of this country.

## Stub-Ends of Thought

The man who tries to lead an automobile life on a wheelbarrow income may expect to come to grief.

Most people make more fuss about what they want than they do about what they need.

# EDITORIAL

## Dr. Talbot's New Book.

The new book of Dr. E. S. Talbot upon Interstitial Gingivitis and Pyorrhoea Alveolaris, soon to be published by The Ransom & Randolph Co., contains a vast amount of original research, covering a period of thirty-two years, and presents many facts as the result of experiments and research with human beings and animals.

The author shows that the primary disease, interstitial gingivitis, is an inflammatory condition which begins at the gum margin (there due to local irritation), at the middle of the root of the tooth, or the apical end of the root (due to local and constitutional irritations). If the irritation is continuous, the inflammation will spread, involving the process for the entire length of the root, the area involved depending upon the location and the character of the irritation.

Pyorrhoea Alveolaris Dr. Talbot shows to be a secondary pathological condition, dependent always upon the first, the inflammatory stage, for its action. The second condition must always be the result of infection. From his researches the author believes that the secondary stage (pyorrhoea alveolaris) has very little if anything to do with the inflammation and absorption of the alveolar process and the exfoliation of the teeth, but is simply a coincident, since pus germs happen to be present in the mouth. The diseases due to infection, requiring constitutional treatment, are rarely seen by the dentist, and are not considered in this work. Only such conditions of the gums and alveolar process as are observed in every-day treatment are here considered.

In a large majority of patients (about 80%) the inflammatory process (interstitial gingivitis) progresses from the eruption of the first set of teeth until the second set drops out, or becomes loose and are removed. The inflammatory stage may be checked under favorable conditions, but is a progressive disease. The author gives two very plausible reasons for this idea, first, the alveolar process is a doubly transitory structure, since it changes its shape in the natural evolution of man, and since it changes its structure and position in the development and loss of the two sets of teeth; second, the alveolar process is an end organ. The roots of the teeth, so far as the disease is concerned, are foreign bodies. The arteries and nerves passing through the bone stop at the roots of the teeth. Poisons, circulating in the blood, accumulate in and around the gums and alveolar process, clog the circulation, cause irritation and inflammation of the coats of the arteries, and produce endarteritis obliterans and absorption of the bone. Nerve-end degeneration, which also causes tropho-neuroses, and prevents normal action of the arteries, is always present in interstitial gingivitis, and is due to local irritation and all the constitutional diseases. These views have been carefully worked out by the author in many of the diseases of the body.

In the treatment of the disease, Dr. Talbot does not offer much encouragement. The endo-transitory nature of the structure and the ever-present local and constitutional irritations due to juvenile and senile states, preclude permanent cures. Stasis of the disease from time to time is possible, but eternal vigilance is necessary to save the teeth after inflammation has once set in and the teeth have become loose. Prophylaxis, therefore, is the only salvation for the teeth.

The author is not an enthusiast of the vaccine treatment, as he believes that the cause is due to local and constitutional irritations and not infections. He expresses the opinion that since germ infection has never been demonstrated as a cause of the inflammation, vaccine treatment is not warranted here, although used so successfully in other diseases. The vaccine treatment may, in a measure, help the general system, and to a certain extent assist in other methods of treatment. Since the cause, however, cannot be removed by this method, no permanent benefit can be expected.

The illustrations are well placed, and those upon bone pathology are considered among the best of our country. Because it is the only work on the subject based upon actual research, it is a valuable addition to advanced dentistry and is recommended to physician, dentist and student.

## SOME OPINONS

I have been familiar with Dr. Talbot's researches for twenty years and am pleased to be able to read in his new work on Interstitial Gingivitis and Pyorrhoea Alveolaris, the results of his efforts. He has carefully worked out the etiology and pathology of peridental disease from every conceivable view-point. No matter what our ideas are, from a theoretical standard, in regard to the cause of the disease and its treatment, the facts brought out by Dr. Talbot's researches and illustrations will assist greatly in obtaining a better understanding of the disease and desired results in its treatment.

H. H. Schumann, M. D., D.D.S.

Chicago, Ill., April 16th, 1913.

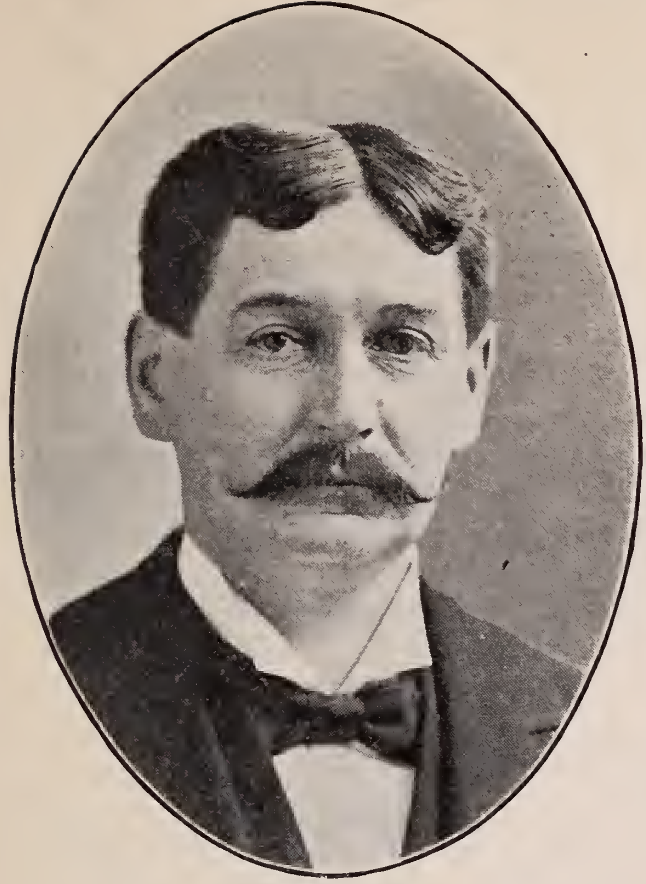
In examining the advance sheets of Dr. Talbot's work on Interstitial Gingivitis and Pyorrhoea Alveolaris, one is impressed by the amount of research presented. A work like this based upon research must convince the reader that the conclusions upon etiology and pathology are reasonable and logical. The illustrations of the different pathologic conditions concerned in the gums, peridental membrane and alveolar process are well done. The treatment is handled from both local and constitutional view-points.

Dr. J. M. Wohlgemuth.

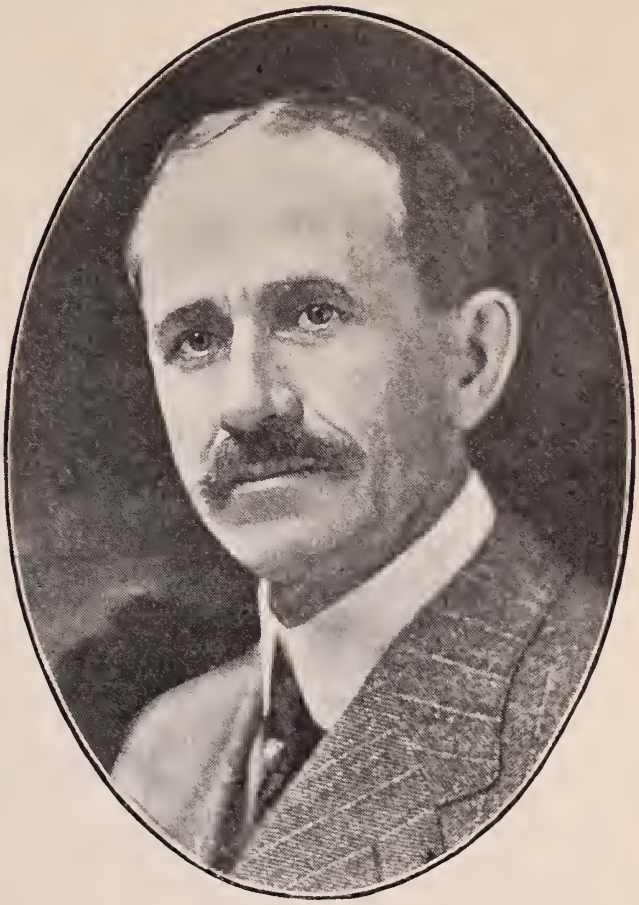
Chicago, Ill., March 31, 1913.

Subscriptions for the book may be sent to The Dental Summary, Toledo, Ohio. Price, $4.00

## Honor to Whom Honor is Due.



G. B. MARTIN, D.D.S., FRANKFORT, IND., Who, in 1887, gave to his students and the dental profession, his process of making cast gold inlays, crowns and bridges, without hope of other reward than the knowledge of duty well done.



O. H. SIMPSON, D.D.S., DODGE CITY, KAN., Who, in 1887, gave his first clinic on inlay casting, and continued to give such clinics for many years at many times and places.

COPY OF A LETTER TO DR. SIMPSON

Medford, Okla., June 18, 1910.

Dr. O. H. Simpson,
Dodge City, Kansas.

Dear Sir:—This is to certify that I have this day examined the inlays which you put in for our townsman, Mr. Clyde Palmer, and I find them to be in perfect condition and preserving the teeth perfectly. Mr. Palmer advises me that they were put in in 1888, and I was certainly surprised to know that this class of work had been in vogue so long.

Fraternally yours,
DR. J. M. BLOOD.

The following extract from a letter from Dr. Simpson expresses the situation as seen by many unprejudiced observers:

> "As viewed from my angle this case is very similar to all other such cases. In every line of work in all parts of the country there are men wrestling simultaneously with the same problems, each in their own way, since there is very little difference in humanity the world over, about the same methods being employed by all. Many of these inventors have lived too soon, or have been badly located. Lucky, indeed, is he who is favorably located, and gets his inspiration at the psychological moment.
>
> "This question has been asked me many times since the beginning of the agitation on this subject: 'If you thought of this first, why

didn't the profession generally take it up?' and this is the way I have replied: 'In the first place, I was young, had no prominence over hundreds of others, located as I was, in a small town on the frontier. The gold crown at that time was in the ascendency, and was advocated as the panacea for all forms of tooth restoration, and no prejudices existed even against anterior shell crowns. When I would be demonstrating inlays, and the others giving gold crown clinics, the imitators (which are the bulk of the profession) could not be interested in my methods of producing inlays, as it was not a recognized method of operating, and I could not make it popular, because I was not connected with any institution of dental learning, and didn't live in a city. All kinds of arguments were advanced against the inlay, and some of them nothing but time would disprove. For instance, some would say: 'A chain is no stronger than its weakest link,' and the tip, or mechanical filling, as we called the inlay then, would be no better than the cement joint, which was sure to dissolve. Others would say, 'What is to prevent the tooth from decaying in another place? and why not place a gold jacket all over the tooth, and get more money for the operation?' These and many others were the prejudices I had to combat.

"The profession was simply not ready for the inlay. The 'Bell Wether' had not started that way. There were a few other men scattered over the land doing just what I was, all ignorant of the other's work; gradually converts were won. They had good ideas, and improved our methods. So it would be hard to say to whom does the greatest credit belong in the evolution of the inlay.

"At the time Dr. Taggart came out with his casting machine, half of the profession was making some kind of an inlay; the inlay was a known quantity. He inherited all advancement that had been made in process and education up to that date. However, he is a clever genius, and deserves a world of credit for what he has done. But there are others, and to compel some men I know to pay for the right to contour a tooth in wax, remove and invest same in plaster of paris, or any of its combinations, would be both an injustice and ingratitude."

Those who have read the decision in the Taggart case know that the final decision was based largely upon the testimony of these two men. Dr. G. B. Martin, of Frankfort, Ind., and Dr. O. H. Simpson, of Dodge City, Kansas.

Every dentist owes a debt of gratitude to these men, and to many others for their untiring efforts toward the advancement of the profession; and, especially in this case, to Dr. M. F. Finley, Secretary of the National Dental Protective Association, who has done an immense amount of work without compensation of any kind, and to whom the favorable outcome is very largely due.

*Editor Dental Summary:*

Dr. Robin Adair, of Atlanta, Ga., is at present engaged in compiling a book upon the subject of Oral Hygiene, Prophylaxis and Alveolar Pyorrhea. The work is to be of a most practical nature. The first part will contain blanket lectures on Oral Hygiene, which the dentist can fill out as he desires when called upon to deliver lectures before public schools, etc. The latest technique in teaching Oral Hygiene and in cleaning the teeth by the dentist will be given.

The second part will contain a chapter on how to institute a systematic Prophylaxis Treatment into the practice and the methods of the specialists all over the United States. It will also contain the most recent material about dental nurses.

The last part upon the subject of Alveolar Pyorrhea will omit all theory and deal entirely with the practical side of the treatment of the cases as well as a description of the various treatments now used by the leading specialists in the United States.

Dr. Adair requests that in order that this book may fulfill the object for which it is being written, where the dentists have interesting cases, or some technique that is proving efficient, that they will send him short accounts of same.

The book is written primarily to be used as a text book in dental colleges, but will be of a sufficiently scientific nature for the older practitioner who wishes to engage in this work. D. D. S.

# SOCIETY ANNOUNCEMENTS

## PROGRAM—SECTION ON STOMATOLOGY

**of the**

## American Medical Association

**to be held in**

**MINNEAPOLIS, MINN., JUNE 17-20, 1913**

1. Chairman's Address: Fields for Research in Oral Surgery—Virgil Loeb, St. Louis, Mo.
2. Social Ethics—E. M. Wooley, Winona, Minn.
3. Mouth Lesions—Stewart L. McCurdy, Pittsburgh, Pa.
4. A Safe, Efficient, Easily Administered General Anaesthetic for Minor Operations—William H. DeFord, Des Moines, Iowa.
5. The Correction of Impediments of Speech in Our Public Schools—H. F. McBeath, Milwaukee, Wis.
6. The Pathology of Root Findings—Vida A. Latham, Chicago, Ill.
7. The Responsibility of the Dentist and Physician in Regard to Mouth Infections and Their Relations to Constitutional Effects—Thomas B. Hartzell, Minneapolis, Minn.
8. Bachelor of Medicine; the Need of This New Degree—William C. Fisher, New York.
9. The Etiology of Trifacial Neuralgia, or Ticdouloureux and Clinical Treatment—Nelson T. Shields, New York.
   Discussion—John A. Bodine, New York, and G. V. I. Brown, Milwaukee, Wis.
10. A Method of Closing a Sinus Between the Antrum of Highmore and the Mouth—L. W. Dean, Iowa City, Iowa.
11. Treatment of Teeth Loosening in Their Sockets Through Inflammatory Degeneration of the Gums and Alveolar Process—Joseph Head and Claude P. Brown, Philadelphia, Pa.
12. Bacteria of the Mouth—A. H. Levings, Milwaukee, Wis.
13. Infective Cysts of the Jaws—F. B. Moorehead, Chicago, Ill.

14. Arrested Development of the Superior Maxillae in Relation to Mental and Physical Efficiency—Joseph S. Evans, Madison, Wis. Discussion—Nelson M. Black, Milwaukee, Wis., and John S. Kirkendall, Ithaca, N. Y.
15. The Relation of Mouth Diseases to Bodily Health—Edward H. Baker, Chicago, Ill.
16. The Surgical Treatment of Post Operation Lip and Palate Defects—George V. I. Brown, Milwaukee, Wis.
17. Interstitial Gingivitis and Pyorrhoea Alveolaris—Eugene S. Talbot, Chicago, Ill.

All those interested in the program are invited to attend the meetings and take part in the discussions.

EUGENE S. TALBOT, *Sec'y.*

## Indiana State Board of Examiners

The next regular meeting of the Indiana State Board of Dental Examiners will be held in the State House at Indianapolis, beginning Monday, June 9th, at 9 a. m., and continuing to Saturday, June 14th. All applicants for registration in this State will be examined at this time. No other meeting will be held until November. No temporary licenses are issued.

The new law requiring the annual registration will be in effect about May 15th. The first registration will take place in December of this year. For application blanks and further information apply to the Secretary,

F. R. HENSHAW,
507-8 Pythian Bldg., Indianapolis, Ind.

## National Association of Dental Examiners

The Thirty-First Annual Session of the National Association of Dental Examiners will be held at the Baltimore Hotel, Kansas City, Mo., beginning July 7th, at 10 a. m., and continuing until adjournment.

Every State Board holding membership in the Association is earnestly requested to have at least one representative present at this session. Members of all State Boards are invited.

Hotel reservations should be made immediately.

JOHN P. STIFF, *Pres.*,
Fredericksburg, Va.
T. A. BROADBENT, *Sec'y.*,
15 E. Washington St., Chicago, Ill.

## New Jersey State Board of Registration and Examination

The New Jersey State Board of Registration and Examination in Dentistry will hold the semi-annual examination in the State House at Trenton, N. J., beginning Monday, June 30th, and continuing Tuesday, July 1st, and Wednesday, July 2nd. Practical work, Monday, June 30th, 8 a. m. Theoretical examination, July 1st and 2nd, 8 a. m. For further information address the Secretary.

Applications must be in the hands of the Secretary five days prior to the examination. The business meeting of the Board will be held at 10 a. m., Tuesday, July 1st.

CHARLES A. MEEKER, D.D.S., *Sec'y.*
29 Fulton St., Newark, N. J.

## Nebraska State Board of Examiners

The Nebraska Board examinations will be held June 16, 17, 18, beginning at 9 a. m., the 16th. Address inquiries to

J. S. Pierce, D.D.S., *Sec'y.*

## North Carolina State Board of Dental Examiners

The next regular meeting of the North Carolina State Board of Dental Examiners will be held in Winston-Salem, N. C., beginning promptly at 9 o'clock on Monday morning, May 26th. For further necessary information address the Secretary.

Dr. F. L. Hunt, *Sec'y.*
Asheville, N. C.

## Pennsylvania State Board of Dental Examiners

The next regular examination of the Pennsylvania State Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday and Saturday, June 11, 12, 13 and 14, 1913. Application blanks can be secured from the Department of Public Instruction, Harrisburg. Further information can be secured from

Alexander H. Reynolds, *Sec'y.*
4630 Chester Ave., Philadelphia.

## Wisconsin State Board of Dental Examiners

The Wisconsin State Board of Dental Examiners will convene in Milwaukee, at Marquette University, on June 16th, at 2 p. m., for examination of applicants to practice in Wisconsin. High School diploma, application and fee of $25.00 must be filed with the Secretary fifteen days prior to above date. Dental diploma to be presented in advance of examination.

F. A. Tate, *Pres.*
W. T. Hardy, *Sec'y.*
422 Jefferson St., Milwaukee, Wis.

## Illinois State Board of Dental Examiners

The semi-annual meeting of the Illinois State Board of Dental Examiners, for the examination of applicants for a license to practice dentistry in the State of Illinois, will be held at the Chicago College of Dental Surgery, corner So. Wood and W. Harrison streets, Chicago, beginning Wednesday, June 4th, 1913, at 9 a. m.

All applications, together with the fees, twenty-six dollars ($26.00), must be filed with the Secretary at least five days prior to date of examination. Address all communications to

T. A. Broadbent, *Sec'y.*
705 Venetian Bldg., Chicago, Ill.

## West Virginia State Board of Dental Examiners

The next annual meeting of the West Virginia State Board of Dental Examiners, for the examination of applicants for a license to practice dentistry in the State of West Virginia, will be held in Huntington, beginning Wednesday, June 11, 1913, at 9:00 a. m. All applications, together with the fees, twenty-five dollars ($25.00), must be in the hands of the Secretary at least one week prior to the date of examination.

Address all communications to

L. Geo. Beerbower, *Sec'y.*
Beerbower-Zeller Bldg., Terra Alta, W. Va.

## Ohio State Dental Board

The next examination of the Ohio State Dental Board will be held in Columbus, Ohio, June 17, 18, 19, 20. Applications must be in the hands of the Secretary June 7th.

H. Bartilson, *Sec'y.*
Columbus, Ohio.

## Southern Dental Society of New Jersey.

The regular meeting of the Southern Dental Society of New Jersey was held at 8 o'clock Wednesday evening, March 19th, at the Dispensary, 725 Federal street, Camden, N. J. The topic for the evening was Anesthesia, and proved to be of absorbing interest. The subjects of Analgesia, Surgical Anesthesia and Blood Pressure were ably presented by men of wide practical experience.

Three papers were read: one by Dr. C. S. Tuttle, of Philadelphia, entitled Anesthesia; another prepared by Francis A. Faught, M. D., of Philadelphia, headed An Additional Safeguard in the Administration of Dental Anesthesia; and a third upon Blood Pressure, by P. H. Markley, M. D., of Camden. Dr. Joseph E. Duffield opened the discussion, which was participated in by Drs. P. H. Markley, H. F. Palm, Alexander McAllister, Joseph L. Nicholson, all of Camden; Dr. T. D. Casto, of Philadelphia; A. E. Smith, of Cleveland, Ohio; Thomas S. Heinicken, of Burlington; P. C. Cosier, of Newport, and J. E. Wolverton, of Trenton.

The Dimelow Facing for Crown and Bridge-work was demonstrated. Dr. Clifton E. Lord, of Mt. Holly, was proposed for membership.

The April meeting of the Society was adjourned from April 16 to April 23, when a novel and instructive program was carried out in the Camden Dispensary, 725 Federal street, Camden, N. J.

May 21st, Prof. Carlton N. Russell will read a paper upon a subject to be announced later on, connected with Oral Surgery.

Alphonso Irwin,
*Chairman of the Executive Committee.*

## Minnesota State Dental Association

The thirtieth birthday of the Minnesota State Dental Association will be celebrated by a large clinic and manufacturers' exhibit in Masonic Temple, Minneapolis, Friday and Saturday, June 13 and 14, 1913. A rate of a fare and a third has been granted by the railroads, and a large meeting is assured. For information address

Benjamin Sandy, *Sec'y.*
636 Syndicate Bldg.

## Oklahoma State Dental Association

The following officers were elected by the Oklahoma State Dental Association at its recent annual meeting: President, R. S. Parsons, Oklahoma City; First Vice President, N. C. Woods, Ardmore; Second Vice President, A. B. Potter, Oklahoma City; Treasurer, A. B. Walker, Fairview; Secretary, C. R. Lawrence, Enid.

The society unanimously voted to continue the post-graduate feature of the meetings, which is proving to be very interesting and profitable.

C. R. Lawrence, *Sec'y.*
Enid, Okla.

## North Dakota Board of Dental Examiners

The next regular meeting of the North Dakota State Board of Dental Examiners will be held in Fargo, N. D., July 8, 9, 10 and 11. For further information address F. A. Bricker, *Sec'y.*
Fargo, N. D.

## An Important Meeting

The annual meeting of the National Dental Protective Association will be held at the Fredonia Hotel, Washington, D. C., may 20, 1913, at 7:30 p. m., for the election of trustees and transaction of business.

E. P. Dameron, *Pres.*
M. F. Finley, *Sec'y.*
1928 Eye St., N. W.

## South Carolina State Association

The forty-third annual meeting of the South Carolina State Dental Association will be held on The Isle of Palms, June 25, 26 and 27, 1913.

W. Busey Simmons, *Sec'y.*
Piedmont, S. C.

## Meeting of the Colorado State Dental Association

The twenty-seventh annual meeting of the Colorado State Dental Association will be held at Manitou, Colorado, June 19, 20, 21, 1913. The clinics will be in charge of Dr. A. W. Starbuck, 1340 Arapahoe street, Denver, Colo., who will furnish any information relative to same. Exhibitors desiring space will please address Dr. F. P. Wells, Exchange National Bank Bldg., Colorado Springs, Colo.

All ethical members of the profession are cordially invited to attend the meeting. Any other information will be cheerfully furnished by the secretary.

H. W. LeFevre, *Pres.*
206 Metropolitan Bldg., Denver Colo.
C. A. Monroe, *Sec'y.*,
302 Mercantile Bank Bldg., Boulder, Colo.

## The Columbia-Maryland Meeting

There will be a union meeting of The District of Columbia Dental Society and The Maryland State Dental Association in the George Washington University Medical and Dental Department Building, 1325 H street, N. W., Washington, D. C., June 12, 13 and 14.

An extensive program of clinics, essays, etc., is being arranged, and we expect a large attendance from the State of Maryland and the District of Columbia.

## The Georgia State Society

The forty-fifth annual meeting of the Georgia State Dental Society will convene at Columbus, Ga., June 12, 13 and 14, 1913, beginning Thursday, June 12th, at 11 a. m. Some very interesting lectures and papers will be presented, also an elaborate clinic has been secured.

Further information will be cheerfully furnished upon request from ethical practitioners of other States contemplating a visit to the meeting, to whom a cordial invitation we extend.

M. M. Forbes, *Sec'y.*
Atlanta, Ga.

## Indiana State Dental Association

The fifty-fifth annual session of the Indiana State Dental Association will be held in the Claypool Hotel, Indianapolis, May 20, 21, 22, 1913.

The officers of the Association recently met at Indianapolis and perfected plans for a three-days' "Post-Graduate Course." The very best instructors and specialists are being secured for each day.

The course will be as follows: Tuesday, "Humanitarian Dentistry"; Wednesday, "Preventive Dentistry"; Thursday a. m., "Prosthodontia"; Thursday, p. m. a great table clinic. The clinic will be held in the hotel.

No tuition fee for the members of the Association or visitors from outside the State who are in good standing in their State Association, but all others desiring to take this course must arrange their tuition fee with the secretary.

Otto U. King, *Sec'y.*
Huntington, Ind.

## The Northern Ohio

The fifty-sixth annual meeting of the Northern Ohio Dental Association will be held at Cleveland, June 5, 6 and 7.

## Lake Erie Dental Association

The fiftieth annual meeting of the Lake Erie Dental Association will be held at Hotel Bartlett, Cambridge Springs, Pa., May 15, 16, 17, 1913. This meeting celebrates the Golden Anniversary of this Society, and the Program Committee have arranged the best meeting ever held.

Entertainment for the ladies. Come and bring them.

C. L. Mead, *Sec'y.*
Union City, Pa.

## California State Dental Association

The next annual meeting of the California State Dental Association will be held on June 2, 3, 4 and 5, in the Hotel Oakland, at Oakland, California.

E. E. Evans, *Sec'y.*

## The Tennessee State

The Tennessee State Dental Association will hold its annual meeting in Nashville, on June 5, 6 and 7, with the following officers in the chair: President, F. W. Meacham, Chattanooga; First Vice President, Wm. C. Gillespie, Nashville; Second Vice President, J. L. Manire, Memphis; Recording Secretary, C. Osborn Rhea, Nashville; Treasurer, W. S. Hutchinson, Nashville; Corresponding Secretary, C. E. Hines, Memphis.

Further information may be had by addressing the Secretary.

## National Dental Association

The 1913 session of the National Dental Association will be held in Kansas City, Mo., July 8th to 11th. The local Committee of Arrangements have selected the Baltimore Hotel as "headquarters" and made the other necessary arrangements for this meeting. The officers and committees are planning to present an exceptionally interesting program, the details of which, together with the other arrangements, will be presented in later journals.

Frank O. Hetrick, *Pres.,*
Ottawa, Kansas.
Homer C. Brown, *Rec. Sec'y.,*
185 E. State St., Columbus, O.

## The Utah State

The Utah State Dental Society will convene for its annual session June 23rd and 24th, 1913. We aim to make this meeting the best ever held in the intermountain country.

We are preparing a splendid program for this occasion.

Please address all communications to Wesley Davis, *Pres.*
W. G. Dalrymple, *Sec'y.*

## The Mississippi Dental Association

The thirty-eighth annual session of the Mississipi Dental Association will be held at Meridian, June 24, 25 and 26, 1913. A fine program is promised and an invitation is extended to all ethical practitioners to meet with us.

Dr. L. B. Price, *Sec'y.*
Corinth, Miss.

## Fiftieth Anniversary Susquehanna Dental Association

At Wilkes-Barre, Pa., Tuesday, Wednesday and Thursday, May 20, 21 and 22, 1913, will be held the next annual meeting of the Susquehanna Dental Association of Pennsylvania. Those who attended last year's meeting (over five hundred dentists) were so pleased with Irem Temple and its conveniences as a convention hall that we have again engaged this beautiful building for our Fiftieth Anniversary.

The committee has been persistently working through the winter months, determined to excel their success of last year. Arrangements are now well under way, and many important and interesting features are in store for those who attend this meeting.

In urging *you* to come to the Fiftieth Anniversary, we want you to get the idea firmly established in your mind that you are going to attend a better meeting than has ever been held here before. It will be worth many times over your time and expense. There will be something for YOU.

It will be an anniversary meeting in every respect, a meeting long to be remembered. It will be greater and bigger in papers, clinics, exhibits, entertainment and attendance.

Begin now to plan your work and take advantage of this opportunity to get in touch with all that is latest in dentistry.

Come to our Birthday Party. You'll enjoy every minute.

Yours fraternally,
W. E. Davis, *Chairman.* Publicity Committee.

## Alabama Board Dental Examiners

The Alabama Board Dental Examiners convenes in Birmingham, Ala., Thursday, June 5th, 1913, 9:00 A. M., at Metropolitan Hotel.

Each applicant shall be 21 years old and hold a diploma from a reputable dental college. Examination in theory, written, on the following branches: Operative Dentistry, Orthodontia, Oral Surgery, Anatomy, Physiology, Chemistry, Materia Medica, Anaesthesia, Pathology, Therapeutics and Etiology, Histology, Prosthetic Dentistry, Metallurgy and Oral Hygiene. In practical work, inserting (1) gold, (1) amalgam filling; construction of bridge, using 1st molar shell crown and cuspid Richmond crown as abutments; porcelain dummies (1st and 2nd bicuspids), (1) posterior Steele facing accepted; assembling and soldering to be done in presence of one or more members of Board. Inserting (1) approximo occlusal gold inlay in 6th year molar, either in mouth of patient or on an articulator; natural tooth set in model with occluding teeth, cavity prepared in presence of Board.

Examination fee, $10.00. Self-addressed stamped envelope accompanying letters of inquiry. Applicants must be present when examination begins.

W. E. Proctor,
Lock Box 113, Sheffield, Ala. Secy. Alabama Board Dental Examiners.

## Southern Branch N. D. A.

The fifteenth annual meeting of the Southern Branch of the National Dental Association will be held at the Chamberlin Hotel, Old Point Comfort, Va., July 22 to 25, inclusive. The Virginia State Dental Society will meet conjointly with the Southern Branch at that time.

THOS. T. MOORE, JR.,
*Cor. Sec'y.* Southern Branch of N. D. A.

## The Southern California Dental Association

The sixteenth annual meeting of the Southern California Dental Association will be held in Los Angeles on the 26th, 27th, 28th and the 29th of May, 1913. An excellent program of essays and clinics, as well as a large and elaborate exhibit, is being arranged. All ethical practitioners of dentistry are cordially invited to be present. Further information will be sent upon request.

JAMES D. MCCOY, *Chairman Publicity Committee.*
708 W. P. Story Bldg., Los Angeles, Cal.

## New Jersey State Dental Society

The forty-third annual convention of the New Jersey State Dental Society will be held in the Beach Auditorium at Asbury Park, N. J., July 16, 17 and 18, 1913, beginning on Wednesday, July 16, at 10 a. m.

The exhibits of modern dental appliances and the latest in office and laboratory equipment will be in charge of Dr. William H. Gelston, 40 N. Thirtieth street, Camden, N. J., who will be glad to furnish information regarding rates and space still available. Early application from those desiring to exhibit with us this year will be greatly appreciated.

The clinics will be in charge of Dr. Henry Fowler, 114 N. Fourth street, Harrison, N. J., and will be comprehensive and of a very high order.

Further announcements will be made from time to time.

EDWIN W. HARLAN, D.D.S., *Sec'y.*
47 Crescent Ave., Jersey City, N. J.

## Meetings of Dental Societies, 1913

The Indiana State Dental Association, at Indianapolis, May 20-21-22.
The Susquehanna Dental Association of Pennsylvania, at Wilkesbarre, May 20-21-22.
The Mississippi Dental Association, at Meridian, June 24-25-26.
The Louisiana State Association, May 22-23-24.
The Kentucky State Dental Association, at Lexington, May 26-27-28.
The Northern Ohio Dental Association, at Cleveland, June 5-6-7.
The Georgia State Dental Society, at Columbus, June 12-13-14.
The Southern Branch National Association, at Chamberlin Hotel, Old Point Comfort, Va., July 22-23-24-25.
The Colorado State Dental Association, Manitou, June 19-20-21.
The South Carolina State Association, Isle of Palms, June 25-26-27.
The Tennessee State Association, Nashville, June 5-6-7.
The Upper Peninsular (Mich.) Dental Society, at Houghton, first week in June.
The California State Dental Association, at Oakland, June 2-3-4-5.
The National Dental Protective Association, Fredonia Hotel, Washington, D. C., May 20.
The New Jersey State Dental Society, Asbury Park, N. J., July 16-17-18.
The National Dental Association, Kansas City, Mo., July 8 to 11.
The Southern California Dental Association, Los Angeles, May 26-27-28-29.
The Minnesota State Dental Association, Masonic Temple, Minneapolis, June 13-14.
The Utah State Dental Society, Salt Lake City, June 23 and 24.

# THE DENTAL SUMMARY

The Magazine That Helps

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OFFICIAL ORGAN

The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office; 195 16th Avenue, Columbus, Ohio
L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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# REGULAR CONTRIBUTIONS

## REMOVABLE BRIDGE WORK*

BY R. B. HOWELL. D.D.S., ANN ARBOR, MICH.

THE STRIKING fact in the history of the world is its upward movement. After the nebula came the orb, after the orb the mineral, after the mineral the plant, after the plant the animal, and after the animal came man.

The evolution of nature was followed by the progress of humanity, but although the history of man has been gradually upward he has not always and everywhere progressed. There are many striking examples in history of this fact. The Greeks were less civilized in the 18th century than they were 2,000 years before; the region watered by the lower Euphrates is less civilized today than it was 5,000 years ago.

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*Read before the Northern Ohio Dental Society, 1912.

There has been, however, a gradual collective progress from the beginning of time and it has all been achieved by individual effort, and this has been inspired by aspiration to some high ideal.

Someone has said that "aspiration is the manifestation in the human heart of the same impulse towards enlargement, beautification and perfection that has been the main spring of all evolution and progress, the fundamental law and force of all human and natural history."

It is from this viewpoint that I wish to approach the subject which I am to discuss on this occasion.

Crown and bridge work as practiced today, although really in its infancy, has had a rough and rugged career, there were times when it seemed to be undergoing extraordinary progress, and then there were those darker periods when there was danger of it being relegated to the shelf as a practical nuisance to the patient, and menace to the technical progress of our profession.

If, however, a close study is made of its history, it will be seen that its progress has been retarded, not so much by the mistakes of those who have had the high ideals and possibilities of the work in mind as by those who have considered only the pecuniary advantages to themselves.

I think there never was a time when so much intelligent thought was being put upon this subject as today. Of course, mistakes are still being made, but they are more the mistakes of over-enthusiasm that in the end serve as stepping stones to that state of perfection at which we are bound to arrive at some future time.

For the purpose of study bridge-work has been divided into two groups: Fixed and Removable. A bridge, as you know, is a combination of attachments and dummies which, when united, perform the functions of the missing teeth which they are supplying. So the purpose of any restoration of this nature is to place in the location of the missing teeth an artificial substitute which will perform *all* the functions of those teeth.

Let us consider these requirements. In the first place it should be natural in contour, restoring the individuality of each tooth, if possible, so as not to interfere with the speech or be unnatural in its environment, i. e., the tongue and its buccal or labial relations. Again, the articulation should be so planned as to bring the stress in the direction and position desired so as not to overburden the abutments and also to allow free lateral movement during mastication. This, by the way, is a common error. It should fulfill all the esthetic requirements where necessary; and also the hygienic in all cases. It is my opinion that a bridge should be planned not only to avoid deleterious effects upon the soft tissues, but the naturally unfavorable conditions should be improved. This can be done in most cases, and particularly where occlusion has been faulty and there is always that concomitant inflammation in the soft tissues due to lack of functional activity. Lastly, it should be not only inherently strong, but also strong in its connection to the attachments, and they in turn to the abutments, Each case which presents itself for treatment requires a careful consideration of all these requirements, and there are just as many dissimilar cases as there are individuals. In some we are influenced from the mechanical side, in some the esthetic demands recognition, and in others the physiological causes us to make radical concessions.

It is a curious fact that good results are obtained in cases which present a certain degree of similarity as far as principles are concerned, by radically different schemes of attachments; all the obstacles involved will be met and overcome according to the viewpoint of the operator. In other words, the personal equation is a prominent factor in the successful application of practical crown and bridge work. For example, it is my belief that no type of artificial structure will ever take the place of a properly constructed fixed bridge, correctly attached in its favorable location. The only successful cases of removable bridge-work which I have seen after a number of years of close observation and in a branch of our work in which I was interested, is either one of two types, which I will mention later in the paper. There are men here who will not entirely agree with Dr. Peeso, and will probably think that I am a fit candidate for the hospital for the insane; yet, strange to say, they are practicing successful bridge-work. It is a difficult matter then for me to become as enthusiastic as I might over removable bridges, as certain types of fixed bridges certainly look good to me. I will, however, endeavor to confine myself to a discussion of the subject of removable bridge work.

What is a removable bridge? It is either one which has the primary support upon the soft tissues with a secondary attachment to the abutments or it is entirely supported upon the two abutments, in both cases being held firmly in position by these attachments, but also allowing easy removal.

Let us then consider an appliance of this type, fulfilling all the requirements of the ideal artificial substitute previously outlined. Since a bridge is a series of dummies and attachments, a discussion upon this subject evolves itself upon a consideration of attachments and dummies.

In reference to attachments as stated before there seems to be just about as many schemes as there are individuals, and although there are many successful, yet it is the source of most of the failures in this class of work. We are too prone in endeavoring to improve upon the last bridge we constructed and which we realized was not just what it should be to deviate from certain absolute principles; by the way, let me add, parenthetically, that the casting scheme has also assisted in these failures, for the possibilities seem so numerous and the technic in construction so simplified that we easily fail. If we are going to succeed we must, as Ulysses of old, stop our ears with wax or bind ourselves to the mast of correct principles and be not led astray by this latest siren of operative dentistry.

To my mind there are very few attachments fulfilling all requirements which are practical. Let us look just for a moment at some of the different schemes which have been advocated and used in the past.

First, there are the different forms of clasps and bands. They were originally made to pass around the natural tooth, but these, of course, are entirely out of the question, owing to the destruction of the tooth substance and also their effect upon the soft tissue at gingival region. They can be dropped without discussion. The next step in advance was the adaptation of these around telescopic crowns, being modified according to the individual, such, for example, as those suggested by Bryant, Bonwill, Hollingsworth, Carmichael and many others. These are not much better for several reasons: (1) They are nearly always irritating to the soft tissue; (2) they are distorted and worn in time in the process of removing from the mouth; (3) practically impossible to make them sufficiently strong to stand up under stress of mastication. Any one of these three disadvantages make them impracticable.

Following these there were the great number of patented attachments, such as Morgan, Griswold, Condit, Gilmore and Roach. Of the latter I wish to speak more in detail later. The disadvantages to most of these are: (1) They are not sufficiently strong to stand the work necessary under hard mastication and wear of time; (2) they require too much apparatus and skill for the ordinary practitioner to apply them properly; (3) most of them require too much stress to be placed upon the abutments; (4) they occupy so much space that it is a difficult matter to apply them without in some way interfering with the proper adjustment of the dummies. With one exception I have never seen any of them used that I thought practical in their application. I mean by that of such structure as to give the longevity naturally expected from a good bridge.

The last attachments which I wish to discuss are those presented by Dr. Peeso, which have been used by him for many years with great success. To again enumerate them: the telescopic crown over crown; telescopic crown with tube and split post; the cap and tube with split post, and the inlay and tube with split post. It is not necessary again to go into a discussion of these, and the indications for their use; suffice to say that to my mind there is one of these attachments which has greater possibilities than any scheme which I have known, and that is the split-post in tube. It is strong, will keep its form and close fit as long as desired and has a large field of application. I am a firm believer in constructing all attachments so that they do not interfere with the normal condition of tooth and gum at the gingival region; for that reason I do not like the telescopic crown over another crown, nor split-post in combination with a cap and tube, and would use these two combinations only as a last resort. It has been my experience that wherever they seem to be indicated there was another possibility more in keeping with my idea.

With the split-post and tube in inlay we have the opportunity of constructing an attachment which will be strong and within the pale of what I would call modern bridge-work; that is the preservation of the teeth in their normal condition as nearly as possible.

In reference to dummies, the great majority of removable bridges are constructed on the saddle principle, and it is never possible in this type to restore the natural contour or individuality of the teeth; they are always too bulky and are sure to interfere with the normal functions of the mouth. In those, however, in which the saddle principle is eliminated there is a possibility to so construct the dummies as to make them as nearly ideal as in any fixed bridge.

It can be seen from a few statements which have been made in this paper that I am not as enthusiastic over removable bridges as Dr. Peeso, but I do believe that they have numerous indications and also that they can be constructed with great advantage much more frequently than they are.

The removable bridges which I wish to present are of two distinct types. (1) Those which have their support entirely upon the abutments with no reciprocal support from the soft tissues; (2) those which have their entire support upon the soft tissues, with a secondary steadying support from one or two abutments.

An example of the first type is just such a case as was advocated by Dr. Peeso, the suspending of one dummy between the second bicuspid and second molar; there being an inlay and tube in the bicuspid and a split-post in this attached to the dummy, on the distal end of which is a wire support, bent hook like, this latter resting in an inlay in which a hole had been made to receive same. A bridge of this type could be made to fill all the requirements. As has been stated, this attachment is practically permanent, as the split-post takes up all wear and they are always stable against any stress which would be placed upon the dummy. There are many other combinations which are possible by the use of this attachment, but judgment should always be used in its application, and careful and correct technic is essentially necessary in its construction.

In reference to the second type, to my mind this is where most of the mistakes are made in the application of the principles controlling removable bridge-work. This mistake is nearly always in the endeavor to gain what is supposed to be additional resistance to the stress placed upon the bridge, by attaching to one or more abutments. A common example of this is where all the teeth on the lower jaw have been lost posterior to the second bicuspid. To my mind no attachment should be made to the abutments used which would in any manner interfere with the free up and down movement. A common method here is to use two telescopic crowns over crowns. If this bridge *is* perfectly constructed, its saddle taken under pressure before assembling for soldering and every precaution taken to make it perfect, in a comparatively short time resorption of the alveolar process will take place immediately under the bridge, due to the pressure, and the bridge will be suspended as it were from the two attachments. This will naturally cause loosening of the abutments and inflammation around their gingival region, finally ending in either the loss of the teeth and construction of a new bridge, or the discarding of the bridge by the patient and the cussing of the operator.

I think the ideal scheme of attachment for a bridge of this type is by use of the Roach attachment. This allows free up and down movement with no limitations; and, by placing the stress properly upon the bridge, no back pull will come upon the abutments and their utility will be greatly enhanced.

There is another advantage to this method: they can be made of vulcanite or cast base and vulcanite, thus greatly cheapening them. This, by the way, is quite important, as most removable bridges constructed of gold are entirely too expensive for the average patient, this in turn greatly benefitting the class who need the work, yet cannot afford large fees.

Some may say that this type outlined is nothing more nor less than a partial plate, and, in fact, that is just what, to my mind, removable bridges of this nature *should* be, and just as soon as you get away from that thought you are most assuredly making a mistake.

Most of you are probably acquainted with the Roach attachment. . It consists of two parts, which may be described as follows: Part one is a round tube, slotted its full length on one side to receive accurately the second part. This tube is made of 26-gauge clasp metal gold. The second part is a solid ball with a long stem, which serves as the means of attachment. This stem has a shoulder situated near the ball, which serves as the boundary between the projected portion and that embedded; the extreme end of the stem has an enlargement to assist in securing anchorage.

There are several other advantages to this attachment in addition to that mentioned before. (1) There is such a small area of contact between the two parts that it is not necessary to have a paralleling instrument to make the adjustment of the piece, thus greatly simplifying the technic. (2) It is the smallest and strongest, these features greatly increasing its indication and use. (3) Either part may be used interchangeably, and can be applied to any style of attachment, inlay, crown or vulcanite.

Take the same case mentioned before: the ball portion may be soldered to a gold crown, cast in inlay and dowel, or in a cast base porcelain crown to the second bicuspid on each side, the other part of attachment being secured to the removable portion of bridge. Additional stability is given by a linguo-alveolar bar of spring gold of about 10 gauge. If the teeth are missing only on the one side, the bar may be extended around and be attached with the same attachment to a crown or inlay on the other side.

All bridges coming under this second type can be constructed by the use of this Roach attachment, and I have yet to see a case where it could not be applied with success.

In conclusion, allow me briefly to state why I do not believe in the universal application of removable bridges, but feel that certain types of fixed bridges still have a great use in numerous locations. Let us consider the advantages claimed for removable bridge-work over fixed:

(1) That they are more sanitary.

(2) There are greater possibilities for the restoration of the lost tissues.

(3) Easy to repair.

(4) Less destruction of the natural teeth for abutment, i. e., less number used.

(5) Can be made cheaper by means of vulcanite.

We are compelled to grant that they can be made cheaper, but only with vulcanite, also that greater restorations can be made. I claim that by means of partial crown attachments, which can be made so perfectly by casting scheme, it is possible to make sanitary bridges, and with less destruction to the teeth used as abutments. In the question of a case of repair, this is, of course, much simplified, where it can be taken from the mouth and we are compelled to grant that to a certain extent. As a matter of fact, a good proportion of troubles is due to a failure in the fixed portion of the attachments; and as most cases for repair in fixed bridges are due to broken facings, these in turn having been greatly facilitated by removable facings, the advantage claimed on question of repair is just about balanced.

The fact that a bridge can be made sanitary, and at the same time firmly fixed in place with a minimum amount of destruction to the teeth used as abutments, to my mind gives it first choice on the upper jaw, in conditions where indicated, over any removable scheme which may be chosen.

# ORAL HYGIENE*

BY H. W. CAMPBELL, SUFFOLK, VA.

IT IS NOT my purpose to discuss the subject of oral hygiene in an elementary manner before this association. Such rudimentary propositions as the proper care of the mouth and teeth with brush, floss and the well-known antiseptic preparations are familiar to every practitioner, and it is presumed that all, to a greater or less extent, impress the patient with the importance of the necessary means for preserving oral cleanliness. No practitioner who neglects the simple and easily imparted instructions necessary for the comfort and health of his client is worthy to rank as a professional man, nor will he long receive the confidence and respect of the public. Neither do I propose to discuss the abstract proposition of oral hygiene, but rather to show how others think and feel about the way the dental profession deals with this subject: "To see ourselves as others see us, will from many blunders free us."

There is a great deal of agitation among the dentists of the world for higher ideals along the line of educational standards, and rightly so, since the present requirements are in many instances disgracefully low. This agitation also extends to the parent profession, medicine; again rightly so, for the standards in many institutions which pretend to furnish medical instruction are as bad as in the dental institutions. The money end of the question as it relates to educational institutions is responsible for this situation in both the dental and the medical professions. If you are skeptical, do a little investigating and you will be shocked to discover the truth in its unvarnished ugliness. What, then, is the cause of the agitation for better conditions, higher ideals, more thorough purpose, to improve the ability and efficiency of the dentist and the physician? Primarily, the most intelligent and well equipped members of the profession, who have discovered and exemplified great laws and principles governing the etiology and pathology of diseases as well as its therapy. Such men have been, and are, a benefaction to the race, and it is the inspiration born of such work that has pushed, literally compelled, the great public masses to take notice of the laws of health and sanitation, and to demand better and more efficient service from the profession.

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*Read before the Virginia State Dental Society, 1912.

The secondary consideration is a demand on the part of the public for a more thorough and intelligent understanding of disease and diseased conditions by the men who are to serve them. Listen to this from one of the popular magazines published in New York: "The most of us are permitting ourselves to contaminate our stomachs all the time, when nothing is easier than to prevent some sickness by keeping our mouths clean. Neglected mouths and bad teeth cause a great deal of altogether unnecessary and preventable sickness. What chances are you taking with your mouth?"

This is inspiring; we are proud that a layman's magazine should speak such truth and insist on the importance of a clean and healthy mouth as means of preventing *"some disease."* The layman is beginning to see the importance of a healthy mouth from the standpoint of the profession, and we flatter ourselves that we are impressing the public with the importance of such matters, and that in a general way we may be permitted to continue worn-out methods and antiquated practices at the same old stand.

But listen again: "Very many able dentists let disease originating in the mouth run without hindrance; many dentists do not know disease, except decayed teeth, when they see it. Some dentists cause disease by careless or ignorant teeth tinkering. Some dentists do not fill up cavities: they merely fill over them. Gold caps and bridge work are particularly creative of trouble. The worst cases of anemia, gastritis and nervousness are due to, or are added to, by these gold traps."

How about such a fearful indictment as that? Can the charges be established? Criminal ignorance and neglect, allowing disease to originate and continue in the mouth without hindrance! Not knowing diseased conditions when they are present, except caries of the teeth, causing disease by carelessness or ignorance, causing disease by the very means and methods they adopt for the restoration of the masticating apparatus? Can any picture of ignorance or criminality be painted in more flaming colors than this? Can this layman and his magazine establish these charges which he has put forth to the public? Is he maligning the profession?

It behooves the whole profession to look these questions squarely in the face and to answer them positively and definitely without reservation. If I am to have the courage of my convictions and speak out in meeting, I shall assert that a part of the indictment is true, that probably a large part is true, thanks to the idea that the dentist has to be a "practical" dentist, a good mechanic, and know how to fill up holes in the teeth. This idea has been drummed into the dentist until it has well-nigh become a part and parcel of his very being, and the public has imbibed the idea also, until progressive dentists and progressive laymen, through various channels, have wakened to thought and action, so that the general public has begun to take notice of health laws and to demand that these laws and practices be observed, and even the apathetic, careless practitioner must at once take steps to improve this knowledge and practice or be pushed aside by the profession and the public.

The leading progressive dentists in this country have pointed out the importance of the proper knowledge of medicine, in order that the dental practitioner may be a trained diagnostician and that he may be able to recognize disease when he sees it, and not only to recognize it in a proper and thorough manner, but to give his patients the benefit of his knowledge in bringing about healthy conditions. It has been pointed out by some of the leading progressives that diseases of the eye, ear, nose and throat, tonsils and glands of the neck, may be traced directly to dental lesions. They have also shown the occurrence of ankylosis of the jaw, inflammation of the valves of the heart, and pneumonia, traced to the infection of the mouth, gastro-intestinal disturbances and general infections traced to diseased teeth.

The mucous membranes of the mouth and the nose, sinuses of the face, stomach and lungs, are continuous, and it is by no means hard to see that diseased conditions arising in the mouth may extend to adjacent parts and produce diseased conditions which could easily be overcome, if proper prophylactic care should be given to the mouth and its appendages.

The whole dental profession of the world was greatly shocked about a year ago when Dr. William Hunter, of Charing Cross Hospital, London, a noted physician and lecturer on pathology, wrote as grave an indictment against dentists, and especially American dentists, as was brought by the layman of the magazine to whom I have referred above. It may be said that his charges were to a great degree those of prejudice, and that he was misinformed by what he may have seen of chance patients who came under his care for treatment: that the physician pathologist does not understand the conditions as they obtain in the mouth, and that he is incapable of properly diagnosing the conditions which are found there. It would be a hard matter, however, for the dentist to convince the public that such an eminent practitioner and pathologist as Dr. William Hunter does not know what he is talking about, and it behooves the profession to take cognizance of these charges and by all means combat them.

Listen for a moment to what he has to say: "I speak from experience; the worst cases of anemia, gastritis, colitis and all kinds and degrees of obscure fever of unknown origin, of purpura, of nervous disturbances of all kinds, owe their origin to, and are gravely complicated by the oral sepsis, produced by these gold traps of sepsis. Time and again I have traced the first onset of the whole trouble of which they complain to a period within a month or two of their insertion. The poison hereby produced is particularly hurtful in its effects, for it is dammed up in the bone and cannot be gotten rid of by any antiseptic means which the patient or doctor can carry out; moreover, it is painless and its poisonous effects keep on constantly accumulating without drawing attention to the seat of origin." As I have said before, it will not do to ignore such statements. The doctor is referring specifically in his remarks just quoted to bridge work and crown work, and it is a fact well known by dentists that a great deal of so-called bridge and crown work which is inserted in the mouths of patients is productive of just such conditions as were observed by the eminent pathologist, and that he is no doubt correct when he states that the products of fermentation and diseased conditions which arise from such poorly constructed and ill-fitting bridges are unquestionably taken into the system through the lymphatics and may produce anemia and septicemia, with all their attendant fatal conditions.

To admit that there are certain forms of appliances constructed by dentists which are so unscientific and unsanitary as to produce such diseased conditions as even to *jeopardize the lives* of persons who are seeking relief and comfort is very humiliating. *Failing* to do the very thing for which the profession should stand, practicing septic dentistry, as the English doctor calls it, the dentist has been indicted by this physician, and he has *proven his case*, and in proving it he has also proved more than he probably expected to prove, viz: that to the ignorance and arrogance of the medical profession, more than to any other factor, yes, than to all factors combined, is due the lack of a more thorough and complete understanding of pathology and diagnosis.

The editor of *The Cosmos*, in an editorial reply to Dr. Hunter, admits that the charges are true in regard to certain American dentists. Continuing, he remarks: "It is only recently that it has been possible for dental pathology to secure from medical men or surgeons a sympathetic hearing of their demands for a recognition of the importance of oral sepsis in medical and surgical work. It is only within very recent times and through the insistence of well informed dental practitioners that surgeons were willing to concede the importance of a thorough mouth sterilization as part of the preparation of patients for surgical operations, even in cases where the operation involved the gastro-intestinal tract."

But crimination and recrimination are vain, and criticism is vain, unless they awaken in us a desire to correct what is wrong and to strive for higher knowledge, usefulness and service. Virginia has taken a step toward an advanced move which has attracted attention in the United States and Europe, and which is destined to put the dental profession where it rightly belongs as to educational requirements and advantages. I refer, of course, to the act requiring the M. D. degree. There is a mutual advantage from the position which our State has taken, both to the physician and dentist; and as to the public, it would be hard to estimate the great advantages which they will derive by having more thoroughly educated men, trained in scientific research and investigation.

The germ theory, preventive medicine and antiseptic surgery have awakened in the minds of the great common people new thoughts and ideas, new hopes and inspirations. The great progressive men who have brought forward these wonderful discoveries and principles have enunciated them to the public, and with remarkable quickness they have been taken hold of as truth, and questions are being asked of the profession, questions which *must* be answered and answered in an intelligent and straightforward manner.

The public, while not thoroughly understanding the intricate details of scientific study and research, are quick to make a practical application of known facts, and, with almost intuitive knowledge, to understand and demand that proper care and attention be given to the principles which are laid down for the prevention and cure of disease. To see and understand the truth is the highest function of the human mind. Prejudice and blindness to the truth are the most damaging of all weaknesses in man, and are productive of more deadly consequences than all other shortcomings. They are the twin sisters of ignorance and superstition. They are hard to combat. Truth has to contest every inch of her way to the goal, but though the fight is hard, the victory is sure.

Now, a practical question: On which side are you lined up? Are you for better and higher conditions? Are you seeking truth? You will answer, "Yes, indeed." Then open your mind to every avenue of information; help others to a clearer understanding of the needs of the hour. Carefully weigh the criticisms of others and determine whether they are true or false. *Think, investigate, read.* The day has come, let us arise and lay aside the robes of night and array ourselves in garments of the day and perform the duties of the day.

Do not misunderstand me as to degrees. The M. D. degree often means very little, and so does the D. D. S. Probably the time will arrive when every M. D. degree will mean all that it should stand for now, and the M. D. dentist will mean far more than the D. D. S. now means. The details of this transition can be perfected, and I am thankful to say that our own Virginia men and Virginia schools are leading the procession. Let us not be vain or puffed up, but humble and earnest, striving to serve, the satisfaction of which will be our greatest reward.

# HEREDITY AND EUGENICS*

BY E. P. BEADLES, D. D., DANVILLE, VA.

SINCE prehistoric times three great questions have presented themselves to the minds of men: First, "Where did we come from?"; second, "What are we doing here?"; third, "Whither are we going?" The first has largely been answered; of the second we have some idea; the third has not been touched upon scientifically, though there is and has been much speculation.

## ORIGIN OF LIFE

Every race has had some fanciful answer to the question of the origin of man upon the earth—the Greeks, the Norsemen, the Chinese, the Africans and others. Our own traditions have been lost in the adoption of the idea of the Assyrians, brought down to us through the writings of the Hebrews. They were an essentially religious people, though no people have lacked in religious superstitions.

According to the Semitic races, Adam and Eve were the progenitors of the race of mankind. The Jews believed that all pain and suffering were sent as a punishment for some sin. If we define sin as "a broken law of Nature," they were not far wrong. In the opinion of this writer, this idea of the Hebrews is responsible for the story of Eve and the forbidden fruit. They saw that all women had to suffer in the giving of birth. They could only draw the conclusion that the first woman must have sinned a great sin to bring such pain upon all women who came after. Hence the story of the apple.

## SPONTANEOUS GENERATION

Coming down to almost our own times, we find a great war among thinkers over the question of spontaneous generation. Men saw maggots and other forms of life coming out of apparently dead matter, and many ingenious experiments had to be done before it was positively settled that all life proceeds from a previous life. Then came the question, "How does dead matter become living matter?" The "vital principle" idea still has many advocates. That, in addition to the carbon, hydrogen, oxygen and other elements which go to make up the living organization there is a "vital spirit" put into it—some outside influence—but the majority of scientists of today do not believe this. They think that life is a chemical process; that life is the result of law, the bringing together of certain elements in proper proportions and under proper conditions of heat, moisture, etc. Whether this is continuing today, or whether it was once brought about upon the earth during its cooling process is a disputed question.

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*Read before the Virginia State Dental Society, 1912.

### EVOLUTION A FACT

We know that the process of evolution is a fact. This thought stimulated by Charles Darwin, sixty years ago, is perhaps the most gigantic thing that the human mind has ever tried to contemplate; but certainly akin to Newton's great discovery of the law of gravitation, which explained to us how the spheres are held in their orbits. The objection is made by some that during all the history of man we see no change in him. A little fable may help us. Says Dr. J. A. Thompson in his book on "Heredity": " 'I believe,' said the rose to the lily, 'that our gardener is immortal. I have watched him from day to day since I bloomed, and I see no change in him. The tulip who died yesterday told me the same thing.' " As a flash of lightning in the duration of the night, so the life of man in the duration of Nature. When one looks out on a storm at night he sees for an instant the landscape illumined by the lightning flash. All seems at rest. The branches in the wind, the flying clouds, the falling rain, are all motionless in this instantaneous view. The record on the retina takes no account of the change, and to the eye the change does not exist. Brief as the lightning flash in the storm is the life of man compared with the great time record of life upon the earth.

To the untrained man who has not learned to read these records, species and types in life are enduring. From this illusion arose the theory of special creation and permanence of type, a theory which could not persist when the facts of change, and the forces causing it, came to be studied in detail. "A law," according to Darwin, "is the ascertained sequence of events." Hence the creation of man or the growth of a state is as natural as the formation of an apple or the growth of a snow-bank. All are alike "supernatural," for they rest on the huge unseen solidity of the universe, the imperishability of matter, the conservation of energy and the imminence of law.

### VARIETY AND UNITY

What, then, brought about the conditions of life as we see them around us? The answer is in these words, "Heredity and variation." That variety exists, that there are many kinds of types, grades and gradations in animal and vegetable life, is evident to all. Birds and trees, beetles and butterflies, fishes and flowers, ferns and blades of grass, all these are objects of constant recognition. So do we see variety in individuals, no two are exactly alike, even of the same species. Hence the principle of Heredity is a *condition* of organic life. Under certain conditions, when there is a variation in the species, heredity hands it down to succeeding generations. If the change is for the better, the species grows and multiplies; if for the worse, heredity will just as assuredly carry it to oblivion.

### HEREDITY AND INHERITANCE DEFINED

Says Prof. Thompson, of the Aberdeen University: "In regard to property, there is a clear distinction between the heir and the estate which he inherits, but at the beginning of individual life we can make no such distinction. The organ and its inheritance are, *to begin with,* one and the same. It is easy to make this clear. Every living creature arises from a parent or from parents more or less like itself; this reproductive or genetic relation has a visible material basis in the germinal matter (usually egg-cell and sperm-cell) liberated from the parental body or bodies; by inheritance we mean all the qualities or characters which have their initial seat, their physical basis, in the fertilized egg-cell; the expression of this inheritance in development results in the organism. Thus heredity is no entity, no force, no principle, but a convenient term for the genetic relation between successive generations, and inheritance includes all that the organism is or has to start with in virtue of its hereditary relation.

### DEVELOPMENT

As said above, all living creatures arise from parents more or less like themselves. The reproduction may be *asexual*—by fission, fragmentation, budding and similar processes; or *sexual,* by special germ-cells or gemetes, which usually unite in pairs (fertilization or amphimixis) to start a new individual body. Whatever the *mode* may be, it is our business to inquire in what relation, for instance, does a liberated germ-cell stand to the body which liberates it? In what relation does a fertilized ovum stand to the germ cells of the body into which it develops? What contribution does each parent make to the inheritance? Do ancestors also make contributions, and if so, how?

It is an elementary fact of histology that the nucleus of each cell in the body of an organism contains a number of readily stainable bodies or chromosomes. In many cases it has been possible to count these, and it has been found that the number is *constant for each species.* As Professor Wilson says: "The remarkable fact has now been established that every species of plant or animal has a fixed and characteristic number of chromosomes, which regularly recurs in the division of all of its cells, and in all forms arising by sexual reproduction the number is even."

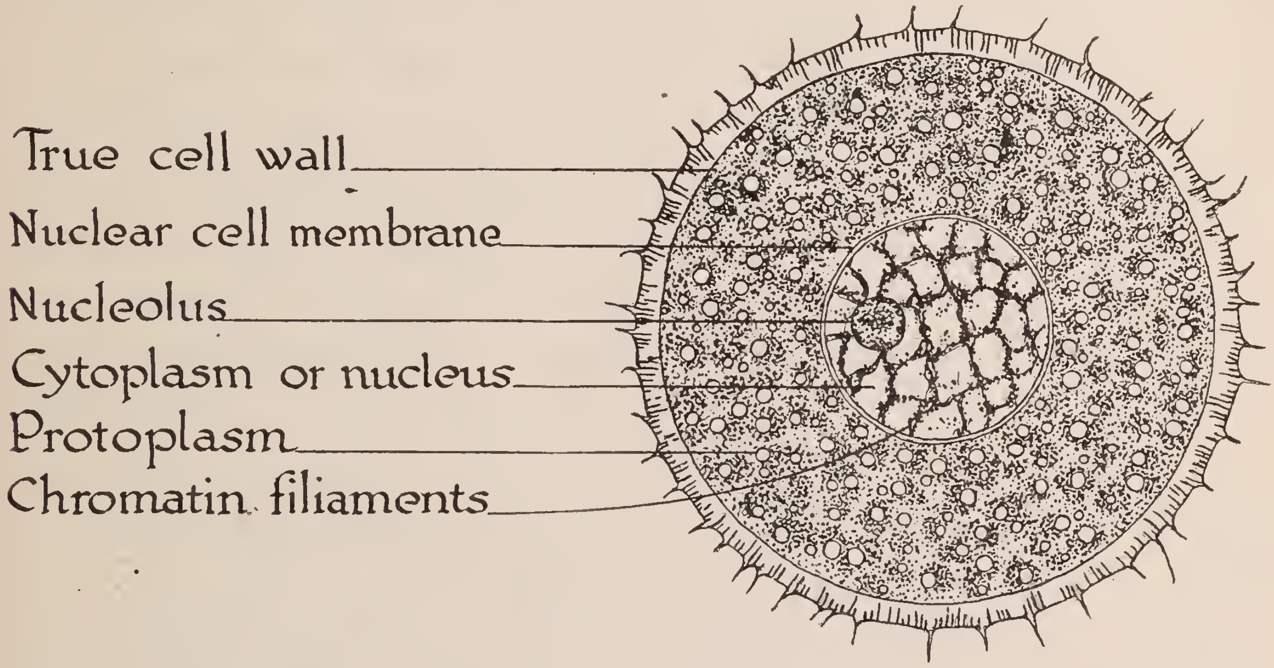
Thus, in some of the sharks, the number is 36; in the mouse, the salamander, the trout, the lily, the number is 24; in the worm sagitta, 18; in the ox, guinea-pig and man the number is said to be 16, and the same number is characteristic of the onion.

### THE CELLS

There are two kinds of cells, the soma or body cells, and the germ or reproductive cell. The organism is composed of cell membrane, cytoplasm and nucleus. Within the nucleus are found the chromosomes, supposed to contain the hereditary qualities.

### WEISMAN'S THEORY

is that there is a germ-plasm which continues from generation to generation, and that out of this plasm come the cells and their chromosomes. In development a part of the germ-plasm contained in the parent egg-cell is not used up in the construction of the body of the offspring, but is reserved unchanged for the formation of the germ-cells of the following generation. Thus the parent is rather the trustee of the germ-plasm than the producer of the child. In a new sense, the child is a "chip of the old block." The animal body is in reality a vehicle for ova; and after the life of the parent has become potentially renewed in the offspring, the body remains as a cast-off envelope whose future is but to die. To use another metaphor, the germ-plasm is the lighted torch handed on from one runner to another. We may think for a moment of a baker who has a very precious kind of leaven; he uses much of this in baking a large loaf; but he so arranges matters, by a clever contrivance, that part of the original leaven is always carried on unaltered, carefully preserved for the next baking. Nature is the baker, the loaf is the body, the leaven is the germ-plasm, and each baking is a generation.



### MENDEL'S DISCOVERIES

In 1866 Gregor John Mendel, Abbot of Brunn, published what some regard as one of the greatest of biological discoveries. After many years of patient experimenting, chiefly with the edible pea, he reached a very important conclusion in regard to the inbreeding of hybrids, which is often referred to as "Mendel's Law." His publication was practically buried in the Proceedings of the Natural History Society of Brunn; those who knew of it failed to realize its importance; in fact, Mendel's epoch-making work was lost sight of amid the enthusiasm and controversy which the promulgation of Darwinism had evoked. Mendel's Law seems to have been rediscovered independently in 1900 by the botanists DeVries, Correns and Tschermak.

### MENDEL'S EXPERIMENTS

What Mendel sought to discover was the law of inheritance in hybrid varieties, and he selected for experiment the edible pea. The trial plants, he says, must possess constant differentiating characters and must be easy of artificial pollination; the hybrids of the plants must be readily fertile and readily protectable from the influence of foreign pollen. Twenty-two varieties were selected, which remained constant during the eight years of the experiments.

In studying the different forms of peas, Mendel found that there were seven differentiating characters which could be relied upon. He then proceeded to make crosses between these, investigating one character at a time. Thus, pollen from a pea of the round-seed variety was transferred to the stigma of a pea of the angular seeded variety. The same was done all along the line. What was the result in the hybrid or cross-bred offspring? It was found that they showed *one* of each pair of contrasted characters, to the almost total exclusion of the other. No intermediate forms appeared. Mendel called that character *dominant* and the character that was suppressed *recessive*. And the first big result was that crosses between a plant with the dominant character and a plant with the recessive character yielded offspring all resembling the dominant parent as regards the character in question. Thus, when tall varieties and dwarf varieties were crossed the offspring were tall. "Tallness" is the dominant character, "dwarfness" the recessive. In the next generation the cross-bred plants were allowed to fertilize themselves, with the result that their offspring exhibited *the two original forms,* on the average of three dominants to one recessive. When the recessive dwarfs were allowed to fertilize themselves they gave rise to recessives only, for any number of generations. The recessive character bred true. When the dominant, on the other hand, were allowed to fertilize themselves, they produced one-third of "pure" dominants, which in subsequent generations gave rise to dominants only; and two-thirds of cross-bred dominants, which on self-fertilization again gave rise to a mixture of dominants and recessives in the proportion of three to one.

A case of mice. Let us take a concrete case from among animals. A grey mouse is crossed with a white mouse; the offspring are all grey. Greyness is dominant—albinism is recessive. The greys are inbred; their offspring are grey and white in the proportion of three to one. If these whites are inbred they show themselves "pure," for they produce whites only for subsequent generations. But when the greys are inbred they show themselves of two kinds, for one-third of them produce only greys, which go on producing greys; while the other two-thirds, apparently the same, produce both greys and whites. And so it goes on.

## SUMMARY

Wherever there occurs a pair of differentiating characters of which one is dominant to the other, three possibilities exist; there are recessives which always breed true to the recessive character; there are dominants which breed true to the dominant character, and are therefore pure; and thirdly, there are dominants which may be called impure and which on self-fertilization give both dominant and recessive forms in the fixed proportion of three of the former to one of the latter. As an explanation of this, Mendel suggested that the hybrid produces *two kinds of germ cells*, that there is in the developing reproductive organ a segregation of germ-cells into two equal camps, one camp with the potential quality of dwarfness, the other camp with the potential quality of tallness. Thus, if there are six ovules, three contain in their egg-cell the primary constituent corresponding to tallness, and three contain the primary constituent corresponding to dwarfness. Each of these is pollinated by a pollen grain, which, by hypothesis, contains the potential quality of tallness or of dwarfness, and if the two kinds of pollen grains are present in equal number, each ovule has an equal chance of being fertilized by a pollen grain with a potential quality of tallness or by a pollen grain with a potential quality of dwarfness. *Therefore,* the result must be a set of offspring partly dominant and partly recessive, in the proportions of three to one. This, in brief, is the famous law of Mendel, which seems to hold good in men as well as in peas.

I must now call your attention to the Mutation theory of DeVries. The Darwinian theory of slow changes producing species is so familiar that I pass it by.

## THE EVENING PRIMROSE

In 1886 DeVries began hunting around Amsterdam for a plant which would show hints of being in what we may call a changeful mood. He tried over a hundred species, bringing them under cultivation, but almost all were disappointingly conservative. It seemed as if most of the species around Amsterdam were in a non-mutable state. It is possible, as Weismann suggests, that in the life of species periods of constancy alternate with periods of changefulness. The human historian has often made a similar remark.

In the course of his wanderings around Amsterdam, DeVries came across a deserted potato-field at Hilversum—a field of treasure for him, for there he found his long-looked-for mutable plant—an evening primrose. It probably came from America, where it is native. It had probably escaped at Hilversum about 1875, and in the following ten years it had spread in hundreds over the fields, but its chief interest was in its changefulness. It had, so to speak, frolicked in its freedom—almost all its organs were varying—as if swayed by a restless tide of life. It showed minute fluctuations from generation to generation; it showed extraordinary freaks like fasciation and pitcher-forming; some were biennial, many were annual and a few were triennial; best of all, it showed what can hardly otherwise be described than as new species in the making. It is possible that the prolific multiplication in a new environment may have had to do with the awakening of the impulsive mutability. In 1887 DeVries found two well-defined new forms. These he hailed as "elementary species" and he applied one of the crucial tests of specific or sub-specific rank. Did they breed true? He found that this was so, from their self-fertilized seeds similar forms arose. Neither of the two new forms was represented in the herbaria at Leyden, Paris or Kew. They seemed distinctively new. The next chapter in the famous investigation began with the transference of samples of the new forms and the parent stock--partly as plants and partly as seeds--from the potato-field at Hilversum to the botanic garden at Amsterdam. The three stocks gave rise, under cultivation, to many thousands of individuals, which bred true along certain lines, and yet gave rise to other new forms. In short, DeVries had found a plant in process of evolution. The predisposition to mutability, which remains a mystery, was present. DeVries gave it scope, and like the primeval gardener, he had the pleasure of giving names to a crop of new creations which emerged before him. From each of his three samples there arose several distinct groups, which, if they had been formed in Nature, would have been reckoned as a distinct species of evening primrose.

But the most interesting feature was the apparent abruptness in the origin of the new forms. They seemed to arise by leaps and bounds, by organic jerks. This, then, is what DeVries calls "Mutation." He claims that most of the progress of both animal and vegetable evolution has come by this method.

Thus we have Mendel's Law of Heredity, DeVries' Mutation theory of descent, and Weismann's theory of how hereditary qualities are transmitted.

The question most vital to us, whose work has to deal with the ailments of mankind, is: *"Can disease be transmitted?"*

This is not a gratuitous question. Perhaps it is best answered in the negative. So says Prof. Thompson. "A disease," says Prof. Martins, "is not an entity, nor a character, but a *process*—an abnormal process, injurious to the organism, which is set a-going by a *causa externa* and runs its course in some part of the body." The process is not transmitted, but the potentiality of it is involved in some peculiarity in the organization of the germ-plasm. In the sense in which the word "inherited" is used by biology, *there are no inherited diseases.* They may be a-going before the offspring is born, but they are not as such inherited. An objector may bring forward the case of haemophilia, which is markedly inheritable. But haemophilia is not a disease.. Does not the subject go along fairly well until he receives a wound? There may be some weakness in the walls of the blood-vessels which makes them peculiarly vulnerable; there may be some obscure peculiarity of the blood which prevents coagulation, but there is no disease. What is inherited is a peculiarity of the vascular system; or perhaps we should put it, negatively, and say that some part of the normal is absent in those who show haemophilia. Some inborn peculiarity of the muscular system, originating as a general variation, may under appropriate conditions of stimulus or lack of stimulus, manifest itself as a disease—such as progressive muscular atrophy.

There may be poisoning or infection before birth; but this is not inheritance; microbic diseases should never be spoken of as heritable, and there is no warrant for believing in the transmissibility of acquired diseases; but we can say that a *prodisposition* to disease is inheritable—and predisposition is the *other side of immunity.* The predisposition to gout is well known to be hereditary; it is probably what might be called a general constitutional predisposition, involving a derangement of the normal metabolism. For while it perhaps finds its primary expression in peculiarities of the digestive and excretory organs, it may affect practically every tissue in the body. Its expression may be accelerated by luxurious living and laziness, but giving the predisposition, it may manifest itself in those who live very carefully and take plenty of exercise. That is the peculiar hardship of it. Take the case of color blindness. We know practically nothing of its origin. It is not known to be associated with any structural defects of the eye; it is certainly not acquired; it arises in a certain percentage of the population, usually in males; it is a good example of a germinal variation which is exceedingly heritable. In the same way we cannot tell what a predisposition to diabetes insipidus means; we know it in its expressions in the body, but its origin is as obscure as that of color-blindness; it is a germinal variation which is exceedingly heritable.

Now, before taking up other special diseases, I wish to say a word about Eugenics, the science which deals with all influences that improve the inborn qualities of the race.

Eugenics has reference to offspring. The success of a marriage, from the standpoint of eugenics, is measured by the number of disease-resistant cultivable offspring that come from it. Eugenics has to do with traits that are in the blood, the protoplasm. That marriage should still be only an *experiment* in breeding, while the breeding of many animals and plants has been reduced to a science, is ground for reproach. Surely the human product is superior to that of poultry.

### FAMILY TRAITS

Just a word about the inheritance of traits. For instance, musical ability is markedly inherited. Bach matured at 22; Beethoven published at 13; Mendelssohn at 15; Mozart composed at 5 years. We get some notion of this peculiar protoplasm when we consider that the Bach family comprised some twenty eminent musicians and two score others less eminent. So we might take artistic composition, mechanical skill, memory, etc.

### MENTAL ABILITY

Low mentality is due to the *absence* of some factor, and if this factor that determines normal ability is lacking in both parents it will be lacking in the offspring. *Two mentally defective parents will produce only mentally defective offspring.* This being true, how great is the folly, yes, the crime, of letting two such persons marry. By helping such persons to live, Charity causes more misery than it can ever alleviate.

In some institutions for the poor the males and females are allowed to run together, and it is appalling how the children accumulate. Epilepsy follows the same law as feeble-mindedness. Two epileptic parents probably produce only defective offsprings, and the defect sometimes takes the form of epilepsy, sometimes that of feeble-mindedness. By proper precautions, both of these classes could be entirely eliminated in any community.

### INSANITY

When both parents have any form of insanity all of their children will go insane. If one parent is insane and the other normal but of insane stock, half of the children tend to become insane; when both parents, though normal, belong to an insane stock, about one-fourth of the children become insane.

### NEUROPATHS

Where a nervous person marries a neuropath, of eleven known offspring six are normal and five neuropathic. When two neurotics marry, two out of six children are normal and one insane.

### EPIDERMAL ORGANS

Heredity in these organs may be considered under the four heads of glands, hair, nails and teeth. The inclusion of teeth is justified since their true epidermal origin is now recognized; they are equivalent to the scales of fishes, but in the higher animals, including man, they are confined to the mouth and jaws.

The *skin glands* are principally the sebaceous and sweat glands, associated functionally with the hair and morphologically with the milk glands. The latter are usually reduced to two in man, but cases of supernumerary mammae are not exceedingly rare. One case is known of a woman with three mammae on the chest who bore a daughter who in turn had three mammae, though the additional one was on the thigh. Skipping hair and nail defects, I will mention teeth. As is well known, each half of either jaw has typically two incisors, one cuspid (or canine), two bicuspids and three molars. To this formula there are, however, exceptions, and these exceptional conditions may run in families. There is recorded a family in which father, son and grandson lacked the lateral incisors of the upper jaw; a second son had them exceedingly dwarfed, and some of *his* children had them so stunted that they were unsightly. Entire absence of teeth is occasionally found as a family trait. There are said to be several such families in America, but they have not been studied in detail. Guilford records the case of a woman who never had teeth nor hair. Her sister was normal, but her son was edentulous and hairless. Abnormalities in excess number of teeth are also found.

These examples must suffice to illustrate predisposition in certain diseases, though the list is a long one. A few remarks about the

### INFLUENCE OF THE INDIVIDUAL

on the race. As one stands at Ellis Island and sees pass the stream of persons, sometimes 5,000 in a day, one is apt to lose sight of the potential importance to this nation of the individual, or, more strictly, the germ-plasm that he or she carries. Every one of those peasants, each item of that "riff-raff" of Europe will, if fecund, play a role for better or for worse in the history of this nation. Formerly, when we believed that factors blend, a characteristic in the germ plasm of a single individual among thousands seemed not worth considering; it would soon be lost in the melting pot. But now we know that unit characters do not blend; that after a score of generations the given characteristic may still appear unaffected by the repeated unions with foreign germ plasm. We might illustrate with the case of Elizabeth Tuttle, who married Richard Edwards. This couple stands at the head of a long line of eminent people. Or of the family of Richard Lee, who came to this country during the reign of Charles the First. What a splendid germ-plasm he brought! On the other hand, we might mention the famous Jukes family, and the sister, "Ada Juke," known as the "Mother of Criminals."

The practical question in eugenics is this: What can be done to reduce the frequency of the undesirable mental and bodily traits which are so large a burden to our population?

There is, first, the method of surgical operation. This prevents reproduction by either destroying or locking up the germ-cells. There are, as you know, two principal methods of surgical interference—one is castration, which removes the reproductive gland and destroys sexual desire; the other is vasectomy, which prevents the escape of the germ-cells to the exterior, but does not lessen desire. Neither of these operations is necessarily painful or liable to cause death. Corresponding operations can be performed on the female; but, of course, these are more serious, as they involve the opening of the abdominal cavity. There is no question as to the right of the state to operate in selected cases. If every feeble-minded, epileptic, insane or criminalistic person now in the United States were operated upon this year, there would be an enormous reduction of the population in our institutions twenty-five or thirty years hence; but on the whole, is this the best treatment? Davenport suggests segregation throughout the reproductive period of the feeble-minded below a certain grade. If, under good environment, they show that their retarded development is a result merely of bad conditions, they may be released and permitted to marry. But such as show a protoplasmic defect should be kept in the institution, the sexes being separated, until after the reproductive period is passed. If this should be done, in thirty years most of our institutional properties might be sold for other purposes.

The cretins, who formerly abounded at Astra, in northern Italy, were segregated in 1890, and by 1910 only a single cretin of sixty years, and three demi-cretins remained in the community.

Just as certain persons show ancestral organs that most of us have lost, such as a heavy coat of hair, an elongated coccyx or an unusually long appendix, so some adult persons retain certain ancestral mental traits that the rest of us have got rid of; and just as the heavy coat of body hair can be traced back generation after generation until we cannot avoid the conclusion that these hairy people represent a human strain that has never gained the naked skin of most people, so imbecility and criminalistic tendency can be traced back to the darkness of remote generations in a way that forces us to conclude that these traits have come to us directly from our animal ancestry, and have never been got rid of.

Our present practices are said to be dictated by emotion, untempered by reason; if this is so, then emotion untempered by reason is social suicide. If we are to build up in America a society worthy of the species *Man*, then we must take such steps as will prevent the increase or even perpetuation of animalistic strains. We hear much of "saving the babies" in our large cities. Saving them for what? Simply that they may become criminals and produce other babies to "save." Far better for them and the rest of us that they should be allowed to die. I would not decry the good that hospitals and charitable organizations do; but there is another view. By curing many that should die for the "good of the race," you perpetuate our troubles. Disease is a necessity. But for disease we would all die. There would not be room to contain us. Wars and famines are blessings in disguise; they thin out that others may live. Let us go on curing, let us relieve human suffering, but adopt the suggestion above—segregate, segregate, thus reducing the number of those to be cured. This is illogical, I know, but we cannot do otherwise—always remembering that the race has somehow taken care of itself for some millions of years, perhaps, and is likely to take care of itself for a good while yet, whether we do much or whether we do little.

There is one thing which lies in the power of all of us, to a certain extent; we can impress the young with the importance of careful marriages. Few young men, when selecting a wife, consider what the children may be. Tell them to select good germ-plasm.

## SUPPLEMENT

Many remains of prehistoric man have been found in the earth. From our standpoint, one of the most interesting finds is known as the Heidleberg man. Of the remains of this man only the lower jaw has been preserved; but of all the bones in the body this one is the most important in telling the kind of man who owned it. The estimated date of this man would not be less than two hundred thousand years.

The Heidleberg man (so named because found near the city of that name) has a massive jaw, which recalls, both by its size and shape, the anthropoid rather than the modern human bone. In man of the present day the chin is prominent, projecting in advance of the lower incisor teeth, while in the Heidleberg jaw, as in the anthropoid, the opposite is the case. To the superficial observer the Heidleberg man would appear chinless, but such is not really the case. The teeth and the alveolar are so strongly developed that they mask the lower or chin part. In modern men the total grinding surface of the teeth is two-fifths of an inch less than in the Heidleberg man. There has been a reduction in dental development, with the result that the teeth and the alveolar part of the jaw have retreated and left the chin prominent. While the upper or alveolar part of the jaw varies according to the size of the teeth, the lower borders of the jaw on which the chin is set varies according to the size of the floor of the mouth.

In order to allow free movement of the tongue and of other parts concerned in speech movements, the lower border of the jaw, which bounds the floor of the mouth, has opened out in modern man. Speech requires that the floor of the mouth should be opened out to give free movements to all those parts concerned in the easy production of speech.

Now, in shape and size the Heidleberg mandible shows a condition intermediate to the anthropoid ape and the modern human forms. The anthropoid jaw is the primitive one; the mandible is framed to serve the purpose of mastication; the mandible of modern man is modified to serve in speech. In the Heidleberg man we must admit that the mandible is mainly adapted for mastication.

The various modifications we associate with speech are also there, but in a partially developed condition. The anatomical features of the mandible indicate that human speech, of a primitive nature, may have been present in this early form of man. At least we reach, in the Heidleberg remains, a point in the evolution of man where the possibility of speech may be called in question.

From the Heidleberg jaw we learn that the human mechanism of mastication was fully developed at the beginning of the Pleistocene Period. The canine teeth, which are so large and prominent in all forms of anthropoids, have in the Heidleberg specimen subsided to the level of the neighboring teeth in the dental series. We must assume that at one period in the evolution of man the canines were prominent and pointed as in the anthropoids, for it is only on such a supposition that the peculiar form of human cuspids, and their position during development, can be explained.

To understand the retrogression of the canine teeth in man it is necessary to understand the mechanism of mastication in anthropoid, and the part played in this act by these great teeth. In anthropoid apes the muscles of mastication are extremely strong, so that the toughest and most resistable of edible things can be crushed between the teeth. In exercising great force there is a tendency for the lower jaw to skid or slip sidewise, but such movements are prevented by the prominent canines coming into contact as the jaws close, thus preventing a false lateral movement. The canines may serve as organs of defense or attack in the anthropoid as in the dog, but their main purpose is that of dental guides for the jaws.

The peculiarity of the mastication in the ancient forms of man was the side-to-side and oblique movements of the lower jaw whereby the food was crushed and pulverized between the upper and lower teeth. Such chewing movements were impossible so long as the canine teeth projected beyond the level of the other teeth.

The retrogression of the canine teeth in the primitive human stock and the evolution from the anthropoid to the early human mechanism of mastication must be sought for in the Pliocene period or even earlier. In the early Pleistocene man the evolution of the human dentition was already completed.

A study of the Heidleberg mandible shows how rough and tough the precarious diet of this early race of man must have been. The part of the mandible which ascends to become jointed with the base of the skull and to receive the attachment of the muscles of mastication is of enormous size. The area of its outer surface is 34 $ctm^2$, that of modern man is 18 $ctm^2$. The masseter corresponds in size to the outer surface of the ascending ramus. We may assume that the surface area of the masseter was twice that of the modern muscle and its thickness was correspondingly great.

Even at this early point in human evolution the crowns of the teeth had assumed a truly human character in size and form, but it was otherwise with their roots. Their necks are almost as large as their crowns, and the roots have become so massive, strong and thick that they have grown together. When knowledge ameliorated the quality of the human diet, the overgrown condition in the roots of the teeth disappeared.

Too much time would be consumed to go further into a description of what these early men were; enough has been said to show the important part played by the teeth and jaws in teaching us how man has reached his present place in the animal kingdom; and we, as specialists of these parts, should have at our command all the knowledge that is available. This knowledge will help us to solve some of the perplexing problems which daily face us in the practice of our profession.

"*Ancient Types of Man*"—Arthur Keith, M. D., Royal College of Surgeons, England.

A man whose virtues are conspicuous usually has a lot of vices that are not.

People who tell their troubles to a lawyer get more trouble for their trouble.

He that is master of himself is greater than he that buildeth a Panama Canal.

When someone does the thing we are afraid to try, we always attribute his success to luck.

Lots of people have harder work accounting for their success than they had in achieving it.

Many times it is wiser to run the chance of being deceived than to make the effort to prevent it.

People who intend to have their own way should always find out first if everybody else is willing.

# AMALGAM AS A FILLING MATERIAL*

BY WM. PILCHER, D.D.S., PETERSBURG, VA.

IN CHOOSING this subject to present to the association, I shall endeavor to recall to your minds the history and the progress made in the use of this valuable material and its application as a tooth-saving agent.

I suppose that all of you use amalgam in your daily practice, as my observation leads me to believe that in fully 75 per cent. of the posterior teeth that are filled, amalgam is the material used.

With all its faults, amalgam is the greatest tooth preserving agent in the hands of the dentist, considering it from the standpoint of the amount of energy and nerve tissue expended by both patient and dentist. While it has had many knocks and cuffs and has been abused for nearly a century, it is doing better service today than ever before, and I feel that it behooves us to pause a while and pay it a tribute, which I feel it justly deserves.

So far as I have been able to learn, amalgam was first used in Paris in 1826 by one M. Treaveau, and was called ''Silver Paste.'' Pure silver and mercury were first used and afterwards the coin silver was substituted. It was introduced by ''quacks'' or unskilled men, not to promote skill or to especially save the teeth, but because it was easy to manipulate. In 1833 two French charlatans came to America and did a thriving practice with this alloy, calling it ''Royal Mineral Succedænum.'' The skilled soft-foil workers of that day looked upon the users of amalgam with scorn, and the American Society of Dental Surgeons declared the use of any material in the mouth which contained mercury to be malpractice. An effort was made to pledge its members not to use this vile material, but champions arose to take up the cause of this new and hated filling material, and what was known as the ''New Departure Corps'' was organized to fight its battles. Dr. Elisha Townsend, of Philadelphia, introduced an alloy consisting of silver 42 and tin 58 parts, and later Dr. J. Foster Flagg espoused the cause of amalgam and did much towards improving the material and giving it a standing in the profession. However, what is known as the ''Amalgam War'' was waged for a long time, many prominent members of the profession bitterly opposing the use of it, and others, equally prominent, advising it.

There are some who at this time denounce the use of this material, but nevertheless, its use and popularity grow, and teeth are saved to the patient and made useful members that otherwise would have to be condemned. In later years, Dr. G. V. Black made a valuable scientific study of amalgam and it is largely due to him that we have the perfected alloy of today.

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*Read before the Virginia State Dental Society, 1912.

The preparation of alloy to be used as amalgam for filling teeth seemed so simple that dentists have often made it for themselves in their laboratories. The result, however, proved to be like some cooks who attempt to make bread: it was either hit or miss and was generally miss. The proportions of the tin and silver were destroyed by the volitilization or oxidation of the tin, as its melting point is much below that of silver, thus making the proper alloying of these metals very difficult. Again, the proper communting of the ingot and the proper ageing of the alloy being so difficult, has each aided in driving the amateur from the field of successful manufacturers of dental alloy. It has been conclusively demonstrated that the services of expert smelters must be employed in order to produce proper alloys for use as amalgam.

About fifteen years ago, a theory was quite widely accepted that the addition of regal metals, such as gold and platinum, added much to the value of amalgam; and such a composition, gold and platina alloy, was sold and advertised as being a proper filling for the anterior teeth. Experience soon proved that these metals add practically no value to dental alloy and now copper is thought to have more value in an alloy than gold. All of you know the value of the simple combination of copper and mercury as a filling material for certain cases. At the present time a large number of formulae contain the three metals, viz: tin, silver and copper. It is not my purpose, however, to deal with the manufacture of alloys, but to consider the use of the modern alloy as an agent for the saving of the teeth of the people. Since Dr. Black and others have made their exhaustive experiments, resulting in reliable alloys, the confidence of the profession in amalgam has been well established and the dear people are reaping the benefit.

The questions uppermost in our minds are: How can the practitioner obtain the best results in the use of amalgam? Why do you see some amalgam fillings which have been placed in the teeth years ago standing well and others failing to preserve the teeth? Why do some seem to stand the process of mastication without flaw or fracture and others completely give way? Why cannot uniformity of wear and durability be established? Why cannot we always succeed with the use of amalgam?

I believe all of the above can be accomplished when due consideration is given to the preparation of the cavity which is to receive the filling, using a carefully selected alloy and properly preparing and introducing the filling.

I will take the liberty of relating a personal experience, which gave me a new interest in amalgam fillings. Some years ago a patient, who, on account of ill-health, remained away from home for quite a long time, and began to need the services of a dentist, acting on my advice, called on the local dentist and when I saw her again I was much interested in the amalgam fillings which were placed in her teeth by the gentleman on whom she called. They were smooth, well formed and the margins were such that you could shut your eyes and pass an instrument across them without detecting when you passed from filling to tooth structure. Some ten years have passed and I do not know that one of the dozen or more amalgam fillings put in at that time have shown any tendency to weaken. They make a good appearance to this day. This awakened in me a greater respect for amalgam fillings and also an intense desire to know and learn his method of preparation and introduction of these fillings.

He was gracious enough to consent to give a clinic at our Staunton meeting just two years ago and I was his patient. I had a splendid opportunity to see all he did and to hear the many questions asked by the spectators gathered around. For instance, many wanted to know why he weighed the alloy and the mercury so carefully to get the exact proportions, and then expressed the excess of mercury from the mass just mixed? "If you want to be so exact, why don't you proportion your mix just like you wish it to remain?" "What do you accomplish by washing the mass in dilute sulphuric acid and then in water?" "Why do you use a mortar and pestle to amalgamate the alloy and mercury?"

These and many other questions asked led me to believe that experienced men in the profession had not given the proper thought and care to the proper preparation of the filling as well as the proper introduction of same into the cavity. You cannot use too much care and method in preparing your filling after you become acquainted with the requirements of the particular alloy you use, for the proportions must be correct, for too much or too little mercury will weaken the filling.

It is conceded without argument that a cavity to receive an amalgam filling should receive as much time and care in the preparation as the one that is to be filled with gold, but is that always the case?

In approximal cavities the proper separation should be secured, so that the normal shape and proper knuckling can be restored; and when needed the rubber dam should be applied, to be sure to keep out the moisture. It is almost essential to use a good matrix to secure an even and uniform density throughout the filling as well as proper contour.

Why measure your proportions, and, if so, why allow for an excess of mercury to be later expressed from the amalgamated mass? Amalgam should be as nearly as possible a chemical compound, although it is said to be one or more of four conditions, viz: a solution of one metal in another, a chemical combination, a mechanical mixture, a solution or mixture of two or all of the above. However, there is strong evidence that if the details of mixing are carried out properly and with dispatch you can secure a chemical combination.

It takes more mercury to bring about complete amalgamation than is required in the finished fillings; therefore, an excess of mercury has to be used in the mixing, and the excess should be expressed at once, without delay, before the mass shows any signs of setting; and also it should be introduced into the cavity at once so that the first process of setting can take place where the filling is expected to remain.

So with a quick-setting alloy dispatch is as necessary as with other plastics. Preparing a half-dozen cavities and filling them from one mix endangers your final success with some of them.

The washing, it is claimed, removes the free oxides and thus improves the quality of the amalgam filling. A good matrix is almost an indispensable appliance in introducing compound fillings, for two reasons: first, you can secure a proper contour and not trespass on the gum of the patient; second, you transform the compound cavity into a simple one, and can pack the amalgam directly, and with the use of a small instrument you can place the filling well against the margins and secure also an equal density throughout the filling.

We are told that too much or too little mercury tends to weaken the edge strength of a filling; therefore, we should be carful to heed what the makers of each alloy has to say about the preparation of same for filling and you will be rewarded, for they have usually tested the alloy out before putting it on the market.

My object in bringing this subject before you is not alone to speak a good word for amalgam, and in a feeble way give to it the praise which it justly deserves, but also to encourage those whose faith is not strong to give it a chance and see if you will not be rewarded. Both patient and dentist owe a great debt of gratitude for the invention and perfection of amalgam as a filling material.

Select a reliable alloy and become acquainted with the details in mixing and introducing same into the cavity, giving due care to cavity preparation and attention to the contouring and knuckling of compound fillings. Be sure the amalgam begins to set in the cavity and not on the outside. Polish the fillings well after they have set and when these details have been well carried out, time and experience will prove amalgam to be no mean agent in restoring carious teeth and making them useful and valuable members for a long time.

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Contributors, publishers and others will please take notice that the address of our editor, Dr. L. P. Bethel, is now 195 Sixteenth Avenue, Columbus, Ohio.

All mail for editorial department, including books for review; exchanges, etc., should be sent to the new address.

'Tis with our judgments as our watches, none
Go just alike, yet each believes his own.

—Pope.

# PERIDENTOCLASIA*

BY ANDREW J. M. MCDONAGH, L.D.S., TORONTO

I HIGHLY appreciate the honor you have done me in asking me to take part in your program.

The title given my paper in your program will in itself indicate to you that my intention is to speak about that which is usually considered the two extremes of the disease commonly called Pyorrhea Alveolaris, and that fact or that expression shows us as clearly as anything could the unsuitableness of the term Pyorrhea Alveolaris.

We will not spend any time considering the nomenclature of the subject, but I believe there is one word which is comprehensive enough to take in all the different phases of the disease which results in the breaking down of the tissues surrounding the teeth, and that word is "Peridentoclasia"; the result, of course, would be "Peridentoclasm."

"Peridentoclasia" would include but do away with Gingivitis, Peridentitis, Alveolitis, Pyorrhea Alveolitis, Alveolar Osteoclasm, and molecular death of the gingivae.

Today the lesion which will be spoken of in the first part of this paper may or may not be the result of gingivitis and rarely is the result of the flowing of pus and therefore it could not intelligently be spoken about as gingivitis or pyorrhea.

The condition referred to is a condition we find in some mouths where the gum tissue gradually disappears and leaves the root of the tooth exposed, sometimes right to the apex.

Observance will show us that this condition obtains generally over the cuspid teeth, the upper centrals and the lingual roots of the upper first molars, provided the condition has not been brought on by having the teeth mechanically moved in their sockets to correct an irregularity.

In order to combat any disease of the human organism, we should try to understand the cause and, if possible, remove it.

Let us consider the usual position of this recession of the gums, or rather let us first consider what sort of people usually have recession of the gums. Is it careful, cleanly people, or is it the uncleanly? After a moment's reflection, you will probably agree with me that in the majority of cases it is the scrupulously clean who have this particular trouble more than any other class. Of course, there are the exceptions, but experience goes to show that in nearly every case the exceptions can be accounted for by some peculiar anatomical construction.

Now let us consider the usual place in which we find this trouble over the cuspid roots more than over any other tooth root, and why?

I have here a specimen skull, which shows us the root of the cuspid tooth more prominent and further forward than that of any other tooth near it. You will notice how thick the bone is over the lateral; you will also notice how thin the bone is over the cuspid, and if the gum tissue were in place you would find that it was stretched more tightly in this position than in any other position in the mouth. What would be the result of that peculiar condition? Simply, if the stretching process were extreme, the blood could not flow freely through the gum tissue, the free margin of the gum would become more attenuated; in fact, would be nothing more than a fold of mucous membrane on itself.

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*Read before the Northern Ohio Dental Society, 1912.

Those who have been reading of autointoxication and the vitiation of the blood stream will immediately see the connection in this particular position. Presuming that the flow of blood through this gum tissue and stretched mucous membrane has not the proper force behind it through an improper action of the heart, or supposing that the vitiated blood is not of a proper quality to pass through those minute vessels as Nature intended that it should, then the tissues hardest to reach will die of starvation, we will have atrophy of the gum margin. It might be called molecular death, because the process would be very slow and minute.

And as there is no reason, under those conditions, for building up or down, as the case may be, of gum tissue, the root will gradually become denuded and the bone be absorbed away until the extreme condition is reached. This condition will be assisted by many contributing causes, continual inflammation in the gum tissue would be an exciting cause, but probably the greatest cause is improper brushing by improper brushes.

You will find many patients brushing their teeth across at right angles to the long axis of the root so strenuously that they cut ridges into the face of the teeth; particularly is this true just at the junction of the enamel and the cementum. This groove, being cut, acts as a sharp edge to chop off little atoms of the gum tissue whenever the gum tissue is pressed against it. Under these conditions, of what use is an astringent application? Would not strong alkaline and astringent washes be contraindicated? Indeed, if you observe carefully, you will find it is quite reasonable to attribute a good deal of this trouble to strong alkaline soap and to astringent mouth preparations, independent of any effect the saprophites produce.

In the beginning of this article I said if you remove the cause you will rectify the condition, and here is the difficulty, to remove the cause, but it is quite possible in a great many cases.

I have the greatest respect and admiration for the orthodontist—he is doing splendid work. Once in a while he may carry his work to extremes in certain directions. For instance, carrying the roots of the teeth forward through the alveolus more rapidly that Nature can build up the tissues to protect those teeth, and we get as a result, in comparatively young people, this condition of recession.

We have here the model (Fig. 1) of a case which will show you what sometimes happens and which will show also the very close connection there is between the condition artificially set up by the orthodontist and the abnormal state, which is sometimes Nature's own product or perhaps the result of some pernicious habit.

The roots of these teeth were carried forward, not very rapidly; it took probably about a year to do it, but more rapidly than Nature would tolerate. The gums did not recede during the operation, nor until the retaining splints were all in place and the patient had practically been dismissed, then the right lower cuspid stripped down in about a week and all of the gums on the other teeth showed signs of an inflammatory process at the gingival margins. The patient was sent to me at that time and I immediately undertook to stop the progress. All of the gums responded but had to be treated about once a week. Then holiday time came, the patient thought she was safe and went away for a holiday without my permission. When she was gone about three weeks she found the left lateral was stripping down. She immediately returned to Toronto, but I had left town and did not return until the lateral had stripped down as you see it on the model, and the gum on the upper left lateral had considerably loosened. Since that time the patient never goes away without permission, but her visits to my office now are quite far apart, being not more than once in a month or two.

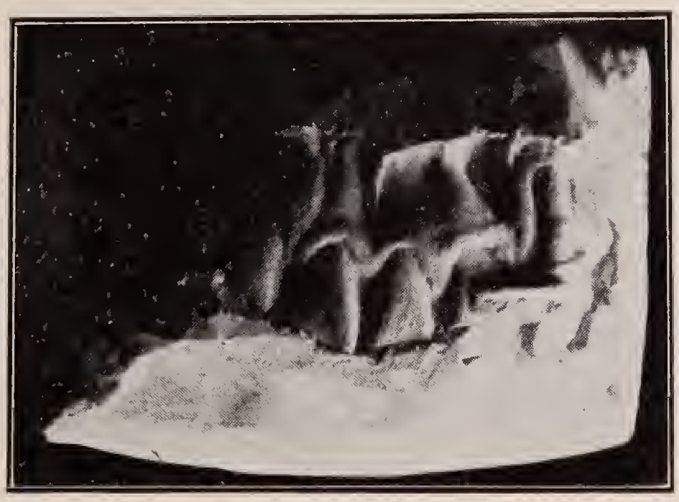

Fig. 1

This case is one similar to many we meet when the regulating is done by the man in general practice, but we do not expect to find it often from the hands of the orthodontist, because of the greater experience and the greater amount of time taken by the orthodontist in treating a case.

This particular case probably would not have occurred had the patient been robust and had she paid less attention to social functions, which greatly taxed her vitality. She at that time was a popular young lady of eighteen or nineteen years of age.

What can we do to overcome this unfortunate condition? Just three things have been successful in my practice: remove the pressure, remove the irritations, whether mechanical or chemical, and help the blood stream locally. Of course, if you can help the blood stream systemically, all the better, but that is often impossible from the dentist's standpoint.

Let us first take up the question of removing pressure. Our first impulse is to dissect the gum tissue in such a way that the gum will be loosened over the prominent tooth or bone. This operation is quite possible and practical but exceedingly painful unless the gum is thoroughly anesthetized.

Our next step, or if we do not care to do any dissecting, our first step will be to reduce the thickness of the root of the tooth just under the free margin of the gum by the use of straight-bladed files or very fine cone-shaped plug finishing burs. Theoretically, you have to be very careful not to cut too deeply lest you expose the large canaliculi or lacuna. As a matter of fact, I have seen the root of the tooth cut to quite a depth at this particular point without any apparent bad results. After you have reduced the root carefully, it has been my practice to freshen the edge of the alveolus, and in this way you can invariably stop the recession taking place and perhaps gain a little tissue.

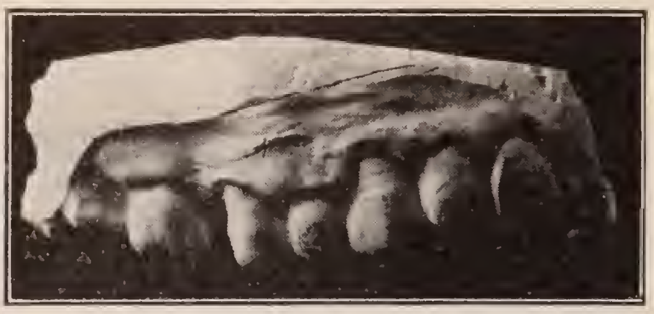

Fig. 2

We have here three models which seem to throw some light on the subject. These three seem to illustrate the different points we desire to make.

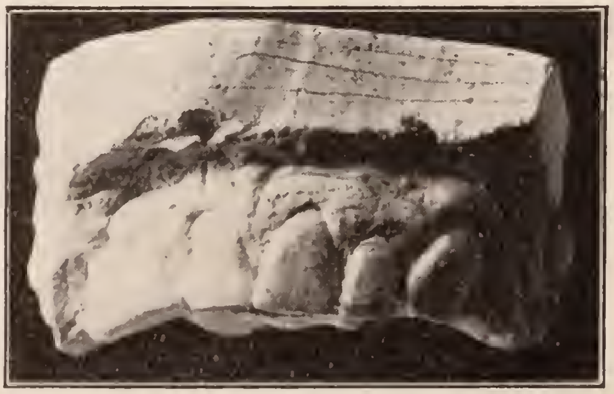

Fig. 3a

Model No. 2 is the model of a mouth of a man about thirty-eight years of age, who has had a crown, for about fourteen years, on the upper first bicuspid. This crown is made entirely of gold and telescopes the root, which is said to be vital. The dentist who made this crown prepared the root, reduced it quite materially in circumference in order to get a conical shaped stump to crown, then the crown was fitted in the ordinary way but made to fit tightly and cemented to place.

That was fourteen years ago, and the gum today over that tooth is perfectly healthy and has not receded a particle, in fact the gum margin is a little thickened, but there is absolutely no appearance of abnormality in the gum tissue, whereas the gums around the teeth both sides of the root, and in fact practically all over the mouth, have receded quite perceptibly. So much for a banded crown.

We have here a model (Fig. 3) of the mouth of a young physician in Toronto, now thirty years old. You will notice he has had the left upper lateral crowned. This root was trimmed by the dentist seven years ago, as if he were going to band it, but he did not do so. The crown is a porcelain crown and fits the root of the tooth beautifully. From the appearance of it in the mouth I would not be surprised to know that the root and the crown had been stoned after the crown was put on. Now, you can plainly see the gum has not receded over this lateral and that it has receded very much on every other tooth in the model.

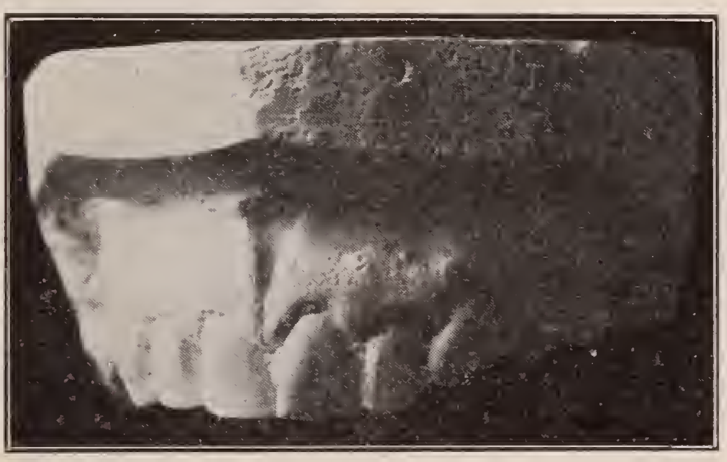

Fig. 3b

We have here another model (Fig. 4) where the crown was put on the lateral root and was not fitted nicely to the root; the labial side of the root was evidently not trimmed at all and the crown extends a little under the gum. A pyorrhea pocket was formed and extended the depth you see indicated by this German silver strip.

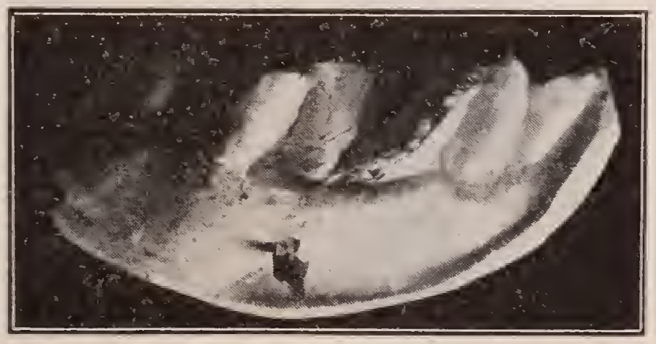

Fig. 4

Of course, there are many crowns of gold which telescope roots, but do not fit them perfectly, where you will have bad results similar to the one in this model, but I do not remember ever seeing a pocket formed or recession taking place over a perfect-fitting crown where the root had been properly shaped and treated and the crown put on when the patient was young, and that probably explains a good deal of the teaching regarding the impossibility of devitalized teeth being affected by pyorrhea.

Here is another model (Fig. 5). You will see by it that the lower right lateral is exposed right to the apex. When it was in this condition I passed an instrument right under the root over the apex and then asked her dentist to take the pulp out of the lateral before I started to operate, as I intended to make gum grow over the lateral.

He bored into the root, took out the pulp and filled the root. After three months' treatment we have the root in this condition. This impression was taken last week, and it shows you we have allowed the gum to grow up over the lower two-thirds of the root.

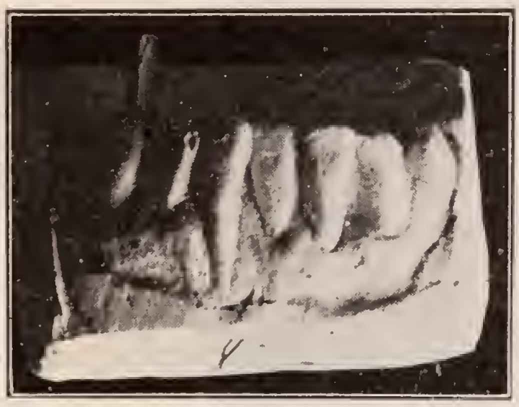

Fig. 5a

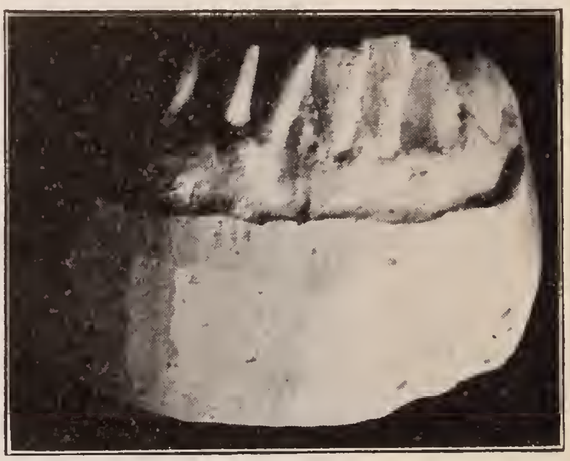

Fig. 5b

The remarkable fact is that this gum has grown so tightly around the root that it is painful to pass an instrument between the root and the gum. The way this result was accomplished was by putting on a regulating appliance and driving that root bodily lingually, at the same time making the surface of the root polished or smooth, and by stimulating the gum tissue on either side of it to grow by curretting.

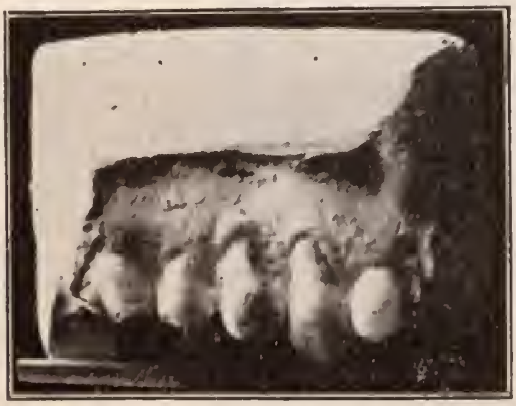

Fig. 6

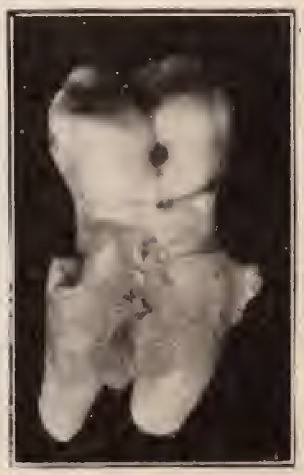

Fig. 7

We have here a model (Fig. 6) showing the left upper cuspid and two bicuspids. When I first saw this case, the first bicuspid root was exposed right to the end and the teeth surrounding it were exceedingly loose. I treated them all and they all tightened in place; then I cut off the labial or buccal part of this first bicuspid root. Fortunately the root was nearly bifurcated, that is, it was almost two roots, so that when I cut off the buccal part of the root I had not much exposed root to polish. After polishing it I removed the mucous membrane from the surrounding tissue, where it lay against the now removed part of the root. At first the gum tissue refused to grow across the space, so after experimenting with it for a time I took a bur and freshened the edge of the alveolus the length of the exposed root, just where it lay against the root, and cauterized the gum tissue, after which the gum tissue took on new life, and we have the result we see here.

I had the honor of showing this case to Dr. Hartzell, of Minneapolis, the other day, and he and I, after examining the case, have come to the conclusion that there is some hard substance grown across that root and supporting the new gum tissue, possibly bone.

A method which has been of great benefit in my practice in treating anemic gums is to use suction. This may be done in several ways. The one which I employ and which has given me most satisfaction is to attach a glass tube to the saliva ejector with a piece of soft rubber on the end. By placing this on the wet gums and running it backward or forward you can greatly help the circulation.

Proper massage, of course, is good, and the Mitchell vibrator also stimulates, but they do not compare in efficiency, according to my experience, with suction—so much for receding gums.

In order not to make this paper too long, I will have to refrain from discussing many phases of this disease which are interesting to you and to me.

For instance, rotating of teeth in their sockets, formation of pus in pockets underneath the gum, both shallow and wide and narrow and deep, the destruction of the peridental attachment without visible pus, the destruction of bone, the result of pyorrhea, to such an extent that pieces of bone of a considerable size are separated from the rest of the jaw. I have a specimen showing this peculiar phase of the disease with me. Fig. 7.

Then we have the loosening of the teeth through senility and all the interesting phenomena of atrophy, gingivitis and alveolitis, which may be rightly considered a part of this subject.

As I said, I am eliminating all of these, and I desire to speak of a practical method or two of mechanically restoring to rigidity teeth which have become useless on account of the loss of their natural support. When the surrounding tissues of the teeth are lost so extensively that even when put in a healthy condition they will not keep the teeth rigid during the stress of mastication, then it is necessary to supply that deficiency by means of a splint.

Many devices are resorted to, such as ligating with silk, wires, telescoping bands, etc. Every one who has had any experience with splints will find that he gradually narrows down the number of types that he uses to one or two varieties, and I will try to describe to you the varieties I use most often.

When I need only temporary rigidity, so that tissues may grow normal and be strong enough to hold teeth, I always use this French twist that I have on exhibition here, being careful, of course, to tie it properly. But where I think it is wise to put on a permanent splint and I do not want to devitalize the teeth to be splinted, I proceed in this fashion:

Drill a hole parallel to the pulp chamber and about three-eighths of an inch deep, just large enough to contain a 20-gauge iridio-platinum wire. This we do with every tooth which has to be splinted, then when you put those wires in place and connect them together you have your rigid splint.

Regarding the technique of this operation: After the hole has been drilled parallel to the pulp, insert the wire, leaving about as much above the hole as you have in it. Now, with a piece of good inlay wax melted around this wire, take the impression of the lingual side of the tooth, remove the pin with the wax on it and make a model of Price's stone, melting the wax away in the process. You have your model of the tooth now with the wire in place. It is wise at this particular point to rotate this wire so that it can be easily removed from the Price's stone model. Now back up this tooth with pure gold or with platinum foil, as you desire, solder the backing to the pin with high-grade gold, let the gold flow all over the backing to strengthen it, then remove your pin and backing from the stone. Do this with each tooth to be contained in the splint, then put them all in place in the mouth and take a plaster impression.

Connect them up and finish as neatly as you can, making sure that you cut away the gold in the interproximal spaces and that the connection takes place just over the contact point of the teeth. That is the simplest way of making this splint but a shorter way, and if you are careful at each step perhaps an easier method, is to proceed as before till you have the wax and pin in place on every tooth at the same time, then take an impression of those impressions and the surrounding tissues in plaster, make a model of the whole thing in Price's stone and make your splint to fit that model.

You have the advantage in this case of being able to have your assistant finish the whole piece once you have your plaster impression.

You who have been using Price's stone of course know its benefits and its peculiarities, but if there are any here who have not used Price's stone it might be wise to say that when filling in your impression you must work the Price's stone in around the pin and on the wax with a camel's hair brush, being careful not to let much of it touch the plaster of Paris until you know that you have a model of the lingual sides of all the teeth.

If you are careful, and it does not necessarily mean you must spend a long time on it, you will find, as I have found, it is the greatest help in your work and the greatest comfort that one could possibly obtain, and you will agree with me that the profession owes the inventor of Price's stone a debt of gratitude.

Sometimes in using this splint we find it wise to devitalize some of the teeth supported by the splint, in which case it is not necessary to change the procedure other than to insert the pin into the pulp chamber.

This is particularly true when we decide that it would be better to extract and replant one of the loosened teeth, and although replanting is often resorted to in dealing with diseased conditions of the dental alveolar joint, he who practices it should consider carefully the conditions and understand how to proceed in order to be successful in obtaining a permanent result without injury to the patient.

### DISCUSSION

**Dr. M. H. Fletcher**, Cincinnati: In regard to Dr. McDonagh's paper I have this to say: I have had the pleasure of twenty-four hours' companionship with Dr. McDonagh, and our opinions are so nearly identical that I have no inclination to differ with him in his work. I would say, however, that his name, Peridenticlasia, indicates only a part of the tissues involved. Nevertheless, I should be glad if the dental profession would do itself the credit to adopt this or some more suitable term than pyorrhea. The word pyorrhea, as all admit, only indicates one symptom of the disease. Peridenticlasia indicates only a tearing down of the tissues about the tooth.

The term Alveolitis may be employed in this disease, as such words are in other surgical diseases, viz., *alveolus* to indicate the locality, and *itis* means inflammation. Inflammation is always present and may be either constructive or destructive here, as is the case in all lesions.

If I may be permitted, I will quote a description used last week on this point: "The various conditions or stages of the disease should be described under such a name as Riggs' Disease, or, better still, Alveolitis. This allows the discussing of etiology, giving the morbid anatomy, describing the various stages, and giving the treatment of the various stages. These stages, of what seem to be one disease, are looked upon by many as several diseases, but the pathology and recovery both point plainly to one source.

Alveolitis is a disease of the bone which supports the teeth and involves the overlying gum tissue, also the periosteum and peridental membranes. It results in the ultimate loss of the teeth by the destruction of the alveolar process. After the onset, or initial lesion in the gums, and the alveolar process has become involved, the malady is primarily that of the bone. The "soft," "spongy" and "bleeding gums" being a natural sequence. This is evidenced by the fact that the gum tissues, although still inflamed, remain intact and nearly to their normal height long after deep pockets have been formed into the bone. The gums also promptly recover their normal health when the bone gets well or the tooth is removed. Again, no amount of gum treatment, pure and simple, will cure the disease. In view of the above statements, the following nomenclature has been adopted. This disease may be described in all its phases by arbitrarily dividing it into stages, as follows:

| | | |
|---|---|---|
| Initial or Simple Alveolitis | - - - - | Chronic Non-Suppurative Alveolitis |
| Non-Suppurative Alveolitis | - - - - - - | Chronic Suppurative Alveolitis |
| Suppurative Alveolitis<br>Necrotic Alveolitis<br>Acute Alveolitis | Descriptive Subdivisions are | Necrotic Non-Suppurative Alveolitis, which is always chronic.<br>Necrotic Suppurative Alveolitis, nearly always chronic, but may be acute. |

The subdivisions are merely descriptive of combined conditions. The suppurative and necrotic stages, both acute and chronic, display all the conditions described under the names chronic ulcerative stomatitis, feted stomatitis, putrid sore mouth, chronic stomatitis, etc. Unsanitary conditions of the mouth undoubtedly encourage the propagation and virility of such microbes as are involved in apthose, thrush, cancrumoris, and other bacterial diseases of the mucous membrane.

Gingivitis is always present to some degree in every stage of alveolitis and is very marked in the advanced stages. Its mildness or intensity is dependent upon several things, such as the condition of the underlying bone, the character of the infection, and the quantity and character of the calculus about the teeth. Mercury and other metallic poisonings intensify the symptoms, as do autointoxication, scurvy and sordes.

In the necrotic stages of the disease we always have more or less destruction of the

the destruction of the periosteum seems to progress with but little necrotic bone. In such instances facial neuralgia is nearly always a symptom, which disappears under proper treatment of the case. A number of cases have come under my observation in which the pains attained to that of tic-douloureux. Several such cases have yielded to treatment of the periosteal lesion, much to the surprise of neurologists, who have always looked upon tic-douloureux as originating from a central or brain lesion instead of a peripheral such as a periosteal lesion. In 1899 I read a paper on the subject entitled "Periosteal Caries," to which I refer you for details.

Dr. McDonagh refers to many cases which, in my opinion, are what should be known as simple alveolitis, that is, the beginning of irritation about the neck of the tooth.

He has beautifully described the pathology and treatment, which is in exact accord with all the established surgical practice I have known. The ability with which Nature takes up the repair of a wound is remarkable. If you remove from a wound everything that Nature abhors, she will heal it.

In the beautiful splinting or retaining method, Dr. McDonagh has shown us he has followed the normal and accepted surgical practice. That is, holding a fractured bone or injured part in normal position until such a time as Nature can rebuild the tissues to their normal state. All a doctor does, if he knows his work, is to remove the hindrance in Nature's way of healing a wound. In the present instance, after removing foreign bodies and microbes, removing other hindrances is holding injured parts in normal positions. Nature is continually on the alert to protect life and repair damage, and if we know how to remove the exciting cause of a disease and give the proper assistance when damage is done, we have then done all any doctor can do, and this is what Dr. McDonagh has shown us how to do.

Dr. McDonagh also speaks of the dangers of orthodontic work in trying to move teeth. I have had some bad results in trying to push such work too rapidly and have seen cases where bad results followed the work of others. I think such evil results occur when the operator either did not know or did not follow the known laws of injury and repair. Orthodontia is only possible because Nature will allow us to injure the tissues by moving the teeth or bones from where she places them and form new and normal tissue about the new positions. She, however, can do such work only so fast, just as she can germinate a seed and bring it to a flower and fruition only in a normal length of time. Too rapid work in orthodontia is sure to result in death of the parts, which injury may be beyond repair.

Dr. Teter, Cleveland: I was very much surprised when Dr. Price told me last evening, as I came into the hotel, that I was to discuss Dr. McDonagh's paper, and I was to go to my room and sit up for three hours and study it over. I do not know why Dr. McDonagh suggested that I discuss the paper. I met him several months ago in Syracuse and enjoyed the paper he read there very much and had a number of enjoyable conversations with him, and he knows I am in the same boat that he is on this subject. There are only a couple of things I intend to say now. He spoke about the use of astringent washes. I am going to suggest the use of nothing but normal salt solution in a great many cases and that you try to get away from the use of highly astringent washes. He passed the models around with some crowns on them and he stated that those were perfect-fitting crowns. This is a subject I think could be discussed with much benefit in a convention of dentists of general practice. I read a paper some months ago before the Cleveland Dental Society on that subject. I think I stated that 75 per cent of the crownwork was an abomination. I do not know but what it was Dr. Price who spoke up and said it was worse than that. I am still of that opinion. If dentists try in their crownwork to make perfect-fitting crowns, they will obviate a great deal of gum disturbance. I appreciate the privilege of discussing this paper, but as the time is short I know you will appreciate the time more to have it occupied by those closing the discussion.

# SALIVARY ANALYSIS*

BY H. CARLTON SMITH, M.D., D.D.S., BOSTON, MASS.

ON THE twenty-seventh of last April Theodore Roosevelt made a number of addresses in Boston and vicinity. On the night previous he was scheduled to stop at my home town at seven minutes past ten, and some two or three thousand of us gathered at the station to see and hear. The train was delayed, and after various promises from railroad officials and after waiting nearly an hour our long deferred hopes were rewarded and Mr. Roosevelt addressed us as follows:

"Friends, it gives me great pleasure to be again in Massachusetts and to be greeted as you have greeted me tonight, and—gracious, the train is moving—I've got to go."

Off he went, and we two or three thousand people traveled home at eleven o'clock at night wondering as to just how many things we had learned about national politics.

If some of you detect a feeling akin to ours as I proceed with this paper, please remember that we did not blame the Colonel much, and, further, that I sympathize with you most heartily.

The reason for this feeling on my part is because of what seems to me a regrettable dearth of actual results obtained during our past ten years of study on the subject of salivary analysis, and my only excuse for taking your time at this meeting is that we may perhaps, by mutual exchange of ideas, accomplish much greater results in the future.

I am tempted to make a rather sweeping statement to the effect that it is hardly wise at present to believe, unreservedly, anything from anybody relative to the diagnostic value of salivary analysis; but I believe we are here, in part, to help change these conditions.

I would like to present a few reasons why I believe it to be worth our while to study salivary analysis, to note what we have accomplished and then, if possible, to see if we can determine why our work is not productive of more positive results.

Why is it worth our while to spend time on purely scientific or perhaps theoretical questions? There are two answers, one more or less ethical, the other more or less practical, and perhaps they may be stated by illustration as well as any other way.

In September, 1908, an article appeared in the *Journal of the Allied Societies,* asking "Is Dentistry a Profession?" and while in time gone by we used to hear and see considerable along this line, there has been less and less of it until I believe today that it is conceded that dentistry *is* a profession, and I can assure anyone thinking otherwise that he will not be interested in this paper.

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*Read before the Northern Ohio Dental Society, 1912.

Dr. Davenport, in the article above mentioned, says: "The professional man should give his best thought and most earnest attention to the acquirement of increased knowledge and skill in order that he may more greatly benefit his patients and give freely to his fellows the results of his inventive genius." That's ethical. When the apostle Paul was at Rome he wrote to the people at Philippi, saying, "Wherever you find truth—there let your thoughts dwell," or "Think on these things"; so let us keep in mind this fact of the professional character of dentistry. It is an absolutely necessary foundation for the effective continuance of purely scientific research.

In the *Dental Digest* for last month (May) there is an interesting description of a case of pyorrhea, in which four molars only were affected, and the writer winds up with this paragraph: "I should be glad to have some supporter of the 'systemic' theory enlighten me as to the reason these four teeth were attacked by the disease and the rest escaped. I am asking this for information and not for argument or in defense of any pet theory which I may hold."

Now, my friends, this sounds to me very much the same as if I should say that because I have gout in one toe joint and not in the others, some explanation is necessary regarding the "systemic theory" of gout. I thought this over a little, and, realizing that physiology is not my strong point, it occurred to me that perhaps the relationship of teeth was more intimate than that of toes, so I asked Professor Cannon of the Harvard Medical School, and was informed that my first guess was a correct one, and that there was as much sense in the one statement as in the other.

My point is that the *recovery* from every departure from the normal is *always* influenced by systemic condition.

The trouble may be purely local, a scratch on the hand perhaps, but the readiness with which the wound responds to local treatment is influenced by systemic conditions. If this is true, it follows that when the dentist has to deal with *chronic* disease he should be "professional," according to Dr. Davenport's notion, and if the examination of the saliva will give even occasional aid in the understanding of a case, it seems to me, from an outsider's standpoint, to be a *practical* thing to give the subject attention.

Notice that I have used the little word of big import "if," and that brings to us our second question for discussion. How much of practical clinical value do we find in a study of the saliva? The answer is easy—in some cases little, in most cases nothing. Are we satisfied to let it go at that? Not if dentistry is to us truly a profession, because there is every reason to expect that when we have learned to interpret results, the chemical examination of saliva will be well worth while.

A number of years ago Dr. Lederlee of the New York Board of Health told me the following story; perhaps he told it to you:

A professor of chemistry of Columbia University was visiting northern Vermont, and on one of the long walks which he was in the habit of taking he noticed a house with a well in a remarkably unsanitary situation, and he stopped and asked a few questions of an old man leaning over the fence. The first was, "Do you drink the water from that well?" "Yes," "Well," says the professor, "I shouldn't think you would dare to; I should think it would make you sick." "Well," answered the old man, "I have drunk that water for eighty years and I don't see as it has hurt me yet. My father drank that water for more than ninety years and died of something else." "Well," asked the professor, hoping to make a point, "didn't some of the family die young?" "Yes," the old man admitted; "I had a brother 'Bill' die when he was sixty years old, but he fell out of an apple tree and broke his neck."

We might all tell stories like this, and they might all be true, but they would constitute no argument against the value of proper sanitation. The fact that numbers of cases are on record of foul mouths with teeth that were never brushed, and in which caries did not exist, is no argument against the value of clean teeth, and because the analysis of saliva means little as yet is no reason why we should give it up, notwithstanding the conclusions given by Dr. Geis to the New York Institute of Stomatology some months since. Rather let us ask, why is our knowledge meager and unsatisfactory? Partly because of *faulty methods* of investigation. We have worked on the analysis of saliva for a little over ten years—long enough for us to realize, in part at least, some of the faults of our methods.

The clinical investigation of saliva is new and faulty methods are at first unavoidable, but the preliminary stages are or should be passed, and it is time for us to do professional work in a professional way. Let us take just a few minutes to compare our methods with the methods of other bodies of men conducting investigations of similar character, i. e., chemical.

The first thing noticed is a lack in uniformity of analytical processes. At a recent meeting of the American Academy of Dental Science a guest expressed surprise that dental chemists had not adopted standard analytical methods.

The pharmaceutical chemists meet every once in a while and decide upon formulæ for preparations and methods of assay, strength of reagents, etc., which shall be official until they are superseded by other methods adopted in the same way. No pharmacist ever attempts the assay of opium, for instance, by any but official methods, although there are many others. The agricultural chemists do exactly the same thing in analysis of soil and fertilizer, and the food chemists also adopt uniform methods, the advantage of the uniformity being that any work done by any member of the profession can be compared accurately and in detail with similar work done by others, and positive conclusions reached much more quickly thereby.

In 1900 Dr. Michaels of Paris practically started the investigation of saliva from a dental standpoint, and we have individually taken up the subject along such lines as have interested us personally, using methods of our own, in large part, and the consequence is that while each may know what the other may conclude, we are not in a position to accept, in all cases, the results of his work. So I would most earnestly advocate the adoption by the National Committee of standard methods, which shall be the result of the best thought of a considerably larger committee than that of the present, and then I would as earnestly urge dropping all other methods of analysis. This, of course, does not preclude the development of new methods, but for clinical purposes stick to accepted formulae. A reason for this is also found in the increased and more general confidence we should all have in methods thus obtained.

If three investigators, situated in Michigan, New York and Massachusetts, differ as regards a given process, each will have his adherents and opinion will be honestly divided. If the three men have united on details of the method, then each can accept the others' results, and a mass of evidence is obtained which will have convincing weight.

I give my own classes three different tests for many of the constituents of saliva. The first is a simple method which is easily applied, taking but little time and inexpensive apparatus, applicable to dental office investigations of small samples. The number of *valuable* tests made in this way are of course few, they serve to increase interest but their scientific worth must not be overestimated.

My second method is the one adopted by the last meeting of the National Association and given us by Dr. Ferris of New York, excepting one or two which are obviously faulty. This, because of my firm conviction of the need of uniform methods.

A third method is one which, in my judgment, will give the most *accurate* results and often is suitable only for exhaustive research with complete laboratory equipment.

Of course, at present, we lack methods necessary to properly fit each of these classes with all the tests we want to make. On the other hand it happens, as is the case in the test of acetone, that the methods of two classes will be identical, i. e., the simplest test for acetone is the most accurate and satisfactory for any sort of investigation.

Now, what is it worth our while to study? First, the mucin content of saliva. We have established some facts which are accepted without dispute in regard to this substance. There is no question but what, other things being equal, an increased amount of mucin is conducive to increased bacterial action. The gelatinous plaque, perhaps more properly called the bacterial plaque, is an established factor in this connection. Whether or not mucin, by hydrolysis, may produce mucin acid in the mouth, as suggested by Dr. G. W. Cook of Chicago, is a question which I have not seen sufficiently substantiated.

In my own experience mucin is diminished in pyorrhea cases, but this is very far from having sufficient confirmatory evidence to be regarded as anything but a step in the establishment of truth. My conclusions are based upon only about forty examinations, made some time ago upon the saliva of pyorrhea patients, and the method was purely a qualitative one. A satisfactory quantitative method is desirable. How shall we do this? Perhaps by a determination of the viscosity, perhaps by precipitation with acetic acid.

Potassium sulphocyanate is another substance which I believe is worthy of most careful study, simply because this substance is peculiar to the oral secretion, that is in any appreciable quantity. I do not feel that we have as yet any positive knowledge which is worthy of wide acceptation as to the function of sulphocyanate.

I do not mean to discount in the least the work done by our friends in Buffalo and elsewhere. All of this work must be done, sooner or later, and negative results are valuable to all interested in similar lines.

We have read a great deal about samples of saliva in which sulphocyanates are wholly absent. I have never happened to have worked upon a sample of this sort, as every saliva that I have had in sufficient quantity has given satisfactory evidence of the presence of sulphocyanate. A red color produced by ferric chlorid in a saliva from which protein substance has been precipitated or rendered soluble by a few drops of *strong* HCl and which disappears upon the addition of $HgCl_2$ is sufficient test for the presence of sulphocyanates, especially if comparison tests are made and the color viewed through a considerable depth of liquid, perhaps two inches.

The acidity of the saliva is a very interesting subject of research, one upon which I am just now at work, consequently it is the one subject which I will ask you to consider somewhat in detail.

By acidity we mean the reaction of saliva, using phenolphthalein as an indicator.

There are several different factors contributing to this acidity, and while some of them are slight in regard to quantity, none can be ignored. The sources of these various acid agents are important, but specific knowledge of same is wanting to a lamentable degree, if we can judge by the best and latest physiological chemistries.

The saliva responds to tests for the following acids: Sulphuric, sulphocyanic, hydrochloric, phosphoric, carbonic, occasionally lactic, acetic, oxalic and uric. There may also possibly exist other organic acids such as diacetic, mucic, etc.

The first two sulphur acids are combined with inorganic bases and do not in any way effect the reaction. It is probable that this is true also of the hydrochloric acid, although it is a well-known fact that the protein compound of HCl (acid metaprotein) is easily formed and that it constitutes the most energetic activator of ptyalin or salivary amylase (Chittendon & Smith), and further, this substance is decomposed by caustic soda which we use in measuring the acidity of saliva. Its presence in saliva has not been disproved. Phosphoric acid as mono- or di-hydrogen salts *does* affect the acidity. Carbonic acid is in many cases the most important acid factor with which we have to deal, and I wish to call attention to or remind you of a few facts relative to $CO_2$ in saliva.

The sources of $CO_2$ are probably three: $CO_2$ dialysed through the salivary glands from the blood; $CO_2$ from fermentation occurring in the mouth; $CO_2$ absorbed from expired air from the lungs.

Two reasons for this statement are: *First,* the blood contains 5% by vol. $CO_2$, and from our first source saliva should contain no more, while as a fact saliva often contains several times this amount; *second,* saliva obtained by mastication of paraffin contains more $CO_2$ than if collected from a saliva ejector. In my own experience, between two and three times as much. This when collected from the same patient on the same day.

The relation of the $CO_2$ in the saliva to the deposition of tartar is of unquestioned importance.

The relation of the $CO_2$ content of saliva to the use of calcareous tooth powders is of probable importance.

I shall be glad to demonstrate Thursday my methods for arriving at these conclusions and the apparatus I use for $CO_2$ determinations, especially the *free* $CO_2$.

The difference between what we might call temporary acidity and a permanent acidity I believe is going to be of diagnostic value. Another factor which I believe to be established is the relationship suggested by Dr. Kirk between the presence of soluble oxalates in saliva and in urine and the nervous diseases. I have examined specimens of both saliva and urine from a considerable number of patients with chorea and with epilepsy, and almost invariably find the soluble oxalates present which are not found in normal samples.

The direct bearing of this fact on the practice of dentistry may not be apparent, and its chief value from our standpoint is in the study of general metabolism, the excess of oxalates always indicating an insufficient oxidation.

The reasons for the presence of oxalates are varied, and they form an important question for future study. The crystals produced by evaporation of dyalized saliva are subject to great variation, as shown by these two pictures of KCl. Both from saliva, but one is just twice as strong as the other.

In passing this topic, allow me to say that the fact that oxalates are present in cases of chorea is no reason for assuming that they are in any way responsible for the disease any more than the fact that patients with pyorrhea almost always show an abnormally high amount of uric acid in the urine establishes any positive relationship between pyorrhea and uric acid. The most we can say is that the condition producing the one often also produces the other, and the value of the tests in either of these two cases is that the indication given by the test often antedates the symptoms of disease, thus giving opportunity for changing conditions and sometimes averting serious trouble. It is easy to say "I don't believe it" and easy to neglect doing the simple things which may be valuable preventives.

Another important test on saliva is the quantitative determination of the phosphates, because of the very valuable contribution recently made by Dr. Percy R. Howe of Boston relative to the activation of the lactic acid-forming organisms by the various phosphatic forms occurring in the mouth.

Dr. Howe concludes that a saliva with high $P_2O_5$ alkaline in reaction and with low chlorides is well suited to fermentations productive of acid conditions.

I trust that you will agree with me that a definite knowledge regarding the acids of the saliva may be of *practical* importance.

The *oxidizing enzymes* and the nitrites seem to be dependent one upon the other, i. e., the enzymes apparently changes the nitrites to nitrates. Of course, this process of oxidation may be a purely chemical one, i. e., independent of the enzyme, but it is not likely, and more than that, we have repeatedly tested the same saliva at intervals of several hours for two or three days and the rule is or seems to be, for the tests were only approximately quantitative, that the higher the oxidase the more rapidly does the nitrite (if present) disappear.

One further word about the methods we are using. I believe there should be a far greater amount of specialization in dental research. The times have long gone by when the whole field of dental knowledge could be properly covered by any one man. It is necessary that, for the best work, we establish very close relations between the dental office and the chemical laboratory.

It is a noteworthy fact that the schools are using men adapted for *specific* work, for example, the head of the chemical department of Harvard Medical School is a doctor of philosophy, not a doctor of medicine. The department of physiology has six teachers and only one with an M.D. degree, two Ph.D.'s, three A.M.'s.

The man with a dental degree, if he has had the necessary preliminary training, may be just as good a chemist as one trained in the technical schools. My point is that we should use the men with the adequate training. Why have I said this? Because in our part of the country there is a tendency to take a man's conclusions for law and gospel if the man happen to be high up in educational circles, irrespective of whether or not he has considered the subject from a *dental* standpoint, and the dental standpoint is the only one from which to judge or criticise any specialized branch of science applied to dental problems. I am not capable of accurately judging of the bearing, on a chemical question, of all the dental points which must be considered; on the other hand, the average dentist fails to grasp the entire chemical situation. I need the help of the dental practitioner, and he or "some of him" needs the help of a thoroughly trained chemist, so I say let us get closer together, as the first and perhaps most important step toward the achievement of positive results is salivary analysis. The dental research of the near future which will be of greatest practical value will be along chemical lines, studied in connection with oral hygiene and oral pathology.

In a very able paper in the May *Cosmos*, Dr. Bunting concludes "that our knowledge of the subject of immunity and susceptibility of the teeth to caries is made up of a heterogeneous collection of facts, pseudo-facts and theories." And I will agree with him even if he had further said that these constituents of knowledge were about in the proportion of the squares of their numerical order or one fact to four pseudo-facts and nine theories, but neither he nor I nor any of us believe that this is knowledge.

The attainment of knowledge is a serious thing, and new knowledge must be sought with greatest care. I believe, as I was taught as a boy, that "it is better not to know so much than to know so many things that *are not so.*"

### DISCUSSION

Dr. R. W. Bunting, Ann Arbor: I believe that I voice the sentiment of every one of the audience when I say to Dr. Smith that the dental profession agrees with him in his plea for scientific investigation of her problems. I say this because I know—perhaps better than he does—how eagerly these articles from his pen and those of his confreres are looked for and read by the dentists of the country.

Never before has dental profession been so keenly awake to her lack of accurate, scientific knowledge of many of the functions which lie definitely within her scope. And she is becoming insistent that her scientific workers concentrate their energies upon these problems in order that they be solved.

I also agree with Dr. Smith when he says that at the present time there is no practical clinical value in the analysis of the saliva due to our lack of knowledge of its chemistry and significance. We hope and feel confident that this will not remain so always, but rather that, by the combined efforts of the various observers, some accurate knowledge may be had which will be of direct diagnostic and practical value. He has struck the keynote when he says that too many spread out their endeavors over the whole range of salivary analysis and that much more would be accomplished by the pursuance of one phase of the problem by each investigator giving it his undivided attention until he shall have determined some of its features. If then the investigators could specialize and at the same time confer with each other, the truth would be sifted from the false and a definite advance made.

The saliva is a complicated problem. It is, when excreted, the combined product of three separate secretions, each a biochemical solution. The viscosity of the solutions and the changeability of its ingredients interferes very seriously with the quantitative or even a qualitative determination of any one of them. When stating a chemical formula, indicating a reaction, a chemist will always ask, "In the presence of what substances?" and this is the difficulty—we do not know what other substances may be present that may interfere with the reaction of our simplest reagents, thus obscuring our results.

If the work which I have done upon the saliva has done one thing more than another it has been to impress me with the deep intricacy of the problem and the extreme meagerness of my knowledge of it. In accordance with my belief in specialization, I have confined my work during the past year to that of the acids present in the saliva and those formed by fermentation. I therefore shall not attempt to discuss that part of the paper which deals with tests other than those for acidity, as I have no work in those lines.

As we consider the saliva from a practical and clinical standpoint, we can see that there are three pathological conditions of the mouth which may be influenced by the nature and reaction of the salivary fluid—namely, Caries, Erosion and Pyorrhea. Of these three I wish to call your attention to the first, and to consider some of the factors which enter into the problem of Caries.

Since the time of Miller we have known that caries is a loss of tooth substance due to acid decalcification and that these acids are produced by bacteria acting upon carbohydrates. Also that this action usually takes place beneath a thin plaque or film. Of this we are quite certain, but of the factors or forces which determine whether or not this decalcification shall take place we know little. We cannot tell why one mouth should be immune to caries and another susceptible, inasmuch as both have the bacteria and both have carbohydrates.

We may then look for that variability which determines immunity in the following factors—the structure of the tooth, the amount of infection present, the amount and character of foods (carbohydrates), the presence or absence of plaques, and the restraining influence of the saliva.

The structure of the tooth and its resistance power is a much discussed subject and is still unsettled. We can, however, say that it is not probable that the tooth may change from soft to hard and then later resoften in a sufficient degree to determine the striking changes in immunity which we so commonly see.

We then turn to the saliva and those factors which are without the tooth. We have a liquid media upon which bacteria can grow readily, the nature of their end products being determined by the character of the materials included as foods. If the foods are nitrogenous the end product is alkaline; if it is carbohydrate the result is acid. We must then determine the source, nature and amount of carbohydrate in the saliva.

In the saliva itself there are two bodies containing carbohydrate radicles, the mucin and the glycogen which are present in variable quantities. In addition we have the carbohydrates of foods retained about the teeth.

From a long series of tests it was found that the excreted saliva collected under normal conditions and maintained at body temperature produces an appreciable amount of acid. This acid formation begins very early and gradually increases up to its maximum, when it is often decreased. The amounts formed were variable and were greater in those samples which contained the most mucin and other solids. But this advance of the acidity, due to fermentation of the saliva alone, seldom went in twenty-four hours above 100 points on an arbitrary scale. However, if to the saliva there was added but 1 per cent of bread, sugar or starch the acid formation would rise upon this scale to 400 to 600 points.

In this manner a large series was made in search of some saliva which would refuse to make this large amount of acid when carbohydrates were added; in other words, we looked for some anti body which might control it. The work done is in no way complete, but as far as it has advanced it seems that practically all salivas form a considerable amount of acid when carbohydrates are present and that the amount of acid formed is in direct proportion to the amount of carbohydrate present.

Sugars and starches do not remain in the saliva. It is seldom that the saliva will react to the most delicate test for sugar ten minutes after a meal. The starches are hydrolysed immediately to sugar and the sugar is washed down the throat. So that free saliva is devoid of carbohydrate principles except the mucin and glycogen on their own formation.

Yet it is perfectly familiar to every practitioner to see that many of his patients carry bread and other foodstuffs between their teeth from day to day. In these interstices and hidden places the per cent of carbohydrate in the saliva at this point is very high indeed. Is it not to be expected that there will be high acid formation and rapid destruction of tooth substance?

Of course this concentrated action may not be due to ingested foods alone. The concentrated mucin might produce considerable acid, but in a series of experiments it was found that a 1 per cent bread in saliva would invariably produce more than twice as much acid as a 25 to 50 per cent mucin solution of the same saliva.

I do not feel that my experiments are large enough to warrant my making any positive statements, but from what I have done it seems to point to the fact that the per cent of ingested carbohydrates remaining in the mouth has a large share in the carious process, and the amount and concentration of the carbohydrates may be a considerable factor in the determination of immunity. If, then, this is true, oral hygiene will be one of the most important factors in the case. And right here is a field for much earnest thought and investigation. We know too little of the principles of oral hygiene. Many of us can put the mouths of our patients in a very clean condition, but they do not remain so. Food quickly becomes packed and lodged about the teeth in spite of all the patient can do. This often is due to faults of tooth form, lack of contact and marginal ridges in the interproximal spaces. Too many are repairing teeth by fillings that do not restore the normal contour or normal interproximal relations. A perfect set of teeth is self-cleansing, and insofar as we depart from the ideal do we introduce conditions which are unfavorable to oral cleanliness.

Let us then, each of us, examine carefully the mouths of our susceptible patients and endeavor to make them as nearly perfect as possible; let us train our patients in the care of their mouths with a view of keeping down the amounts of retained food products, and then let us report to the profession the results of our labors, be they gratifying or disappointing.

In conclusion I wish to congratulate the society in having a paper of such a character as has been given by Dr. Smith. I wish also to express to him my own appreciation of the work he is doing and to extend to him the gratitude of one who is plodding along the same tedious but interesting line himself.

H. Carlton Smith (closing): I want to thank Dr. Bunting for his good opinion, and I want to thank you for your many expressions of good will. In Dr. Bunting's remarks he referred several times to glycogen. I would like to ask him and you just where that glycogen comes from. Glycogen, as I understand it, is not a product of hydrolysis of carbohydrates, but rather a product of metabolism. Personally, I have been unable to demonstrate satisfactorily the presence of glycogen in the saliva, and I shall be glad for information on this point. I feel just as Dr. Bunting has said, that we have just started work along these lines.

If there is anything that I might add to what I said yesterday, it would be to make a further plea for your co-operation, which may consist simply in cheerfully supplying samples or keeping detailed information relative to interesting cases, though perhaps you have not the time for personal laboratory work.

> **To be alive in every part of our being, to realize the possibilities that are in us, to do all that we can, to become all that we are capable of becoming, this is the aim of life.** —Charles Wagner.

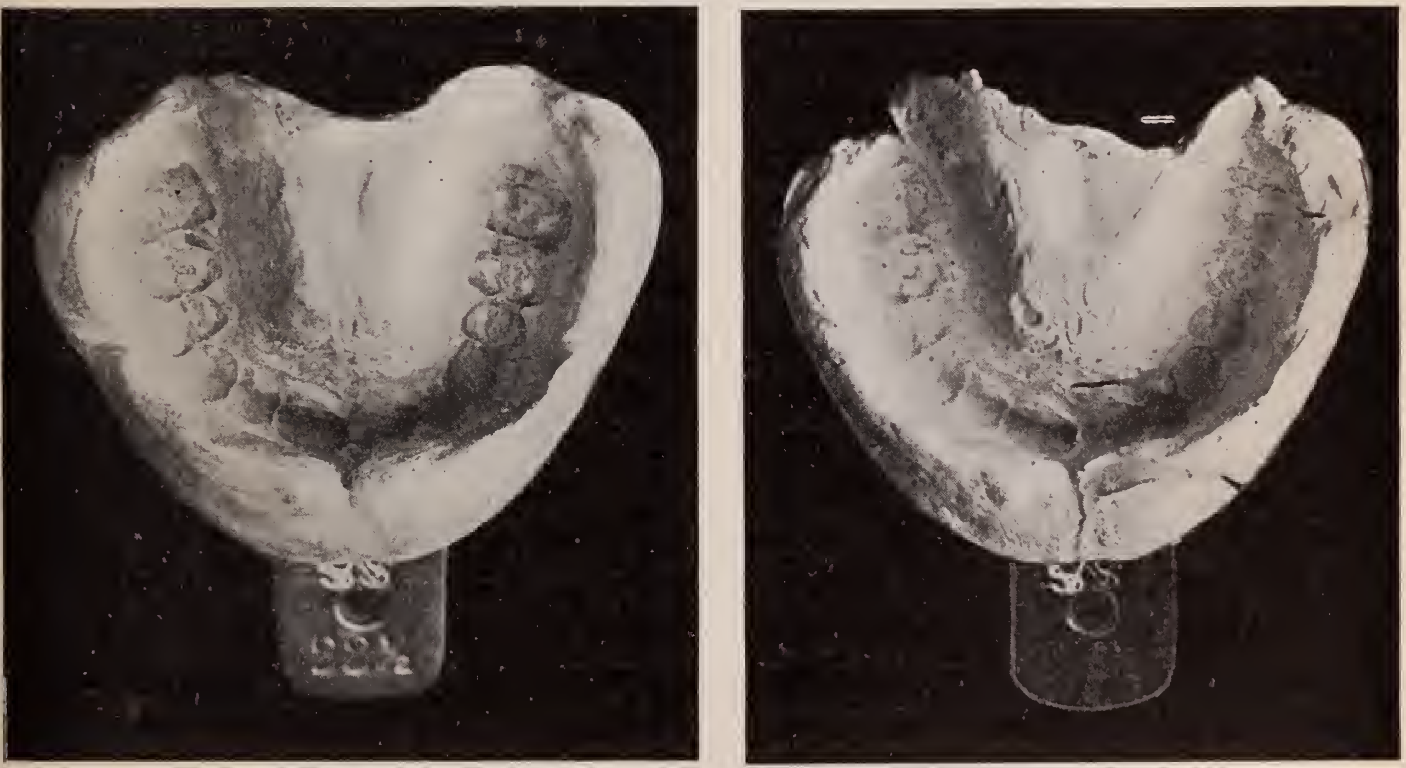
# THE TECHNIQUE OF IMPRESSION TAKING AND MODEL MAKING.

BY RODRIGUES OTTOLENGUI, M.D.S., D.D.S., LL.D., NEW YORK CITY

*(Concluded from page 366, May Dental Summary)*

## VARNISHING

It is not easy to explain just how the impression should be varnished. Previous writers have been charged with not stating exact proportions of the alcohol and the varnish. But exact proportions cannot be given, because varnishes differ, and more especially because the evaporation of the alcohol constantly alters the relations. I can only give general directions. After many experiments I find that I obtain my best results by not applying any varnish until the impression has dried for at least one day. I use shellac varnish so thin that the dried surface of the plaster absorbs it rapidly, and I can usually apply two coats of this very thin varnish without "gobbing up" the surface. When this is thoroughly dry, say in about fifteen minutes, the sandarach varnish is added. This also should be very thin. I apply it with a fairly large brush, well filled, and "flow" it over the parts that overlie the soft tissue; the gum and roof of the mouth.



Before and After Retouching.

I do not allow this varnish, however, to flow into the impressions of the teeth, to prevent which I hold the impression upside down, applying the varnish so that it flows away from the teeth parts. The impressions of the teeth are then carefully varnished with a very small brush charged with very little varnish. Watch any professional painter varnishing a door and it will be seen that his brush is never so filled that the varnish trickles from it in all directions. He obtains his best results by lightly coating the parts; repeating if needed. I have three bottles. One for shellac, one for sandarach, and one with plain alcohol, in which the brushes are thoroughly washed after each use. By this means the brushes are always clean and soft, and the same brush can be used for both varnishes.

### POURING THE MODELS

Filling the impression, or pouring the model, as it is usually called, is a simple procedure, and yet it is often imperfectly done. If the previous technique is followed, the varnished impression will be at least two days old, and consequently so dry that if the plaster for the model were poured into it, the impression would soak up the moisture from the new plaster, producing a crumbly surface, with much imprisonment of air and consequent air holes. The impression, therefore, should be soaked in water before pouring. This does not mean that it should be saturated. Too much water added at this time will cause the plaster of the impression to so deteriorate that it will not fracture properly when separating, but will be mushy or chalky in consistency. It should be just wet enough to properly receive the new plaster. It may be set in water for half a minute; not longer.

Dr. Norman W. Kingsley never varnished his impressions at all. His method was to add a little water-color paint (usually red) to the water used in mixing the impression plaster. This gave the impression considerable color, and differentiation between it and the model was easy. Then as a separating medium he would use soap on a shaving brush. This soap should be thoroughly applied and then as thoroughly removed. It is well to allow the water from the faucet to run into the impression, and at the same time brush out all "soap bubbles," thus avoiding air holes. I make use of this medium for separating when treating impressions for working models, which must be poured without delay, except that I no longer color the impression water, as for my working models I use "Sump," an investment compound which contains color. I believe it is much better to use soap as a separating medium when the impression must be poured while it is fresh, rather than to attempt to varnish a "green" impression. As this often results in the varnish peeling off and adhering to the model, in which case it, the varnish, hinders rather than helps the separating. Some recommend the use of soap even in varnished impressions, but if used at all, it should be used cautiously, as the alkali in the soap will cut the varnish.

In pouring the impression mix the plaster quite thin, almost as thin as milk, and drip it from the end of the spatula in the molar region.

The surface of the impression should be wet enough at the time so that the thin plaster will flow freely into and out of the tooth impressions. Let me say, parenthetically, that I use for mixing plaster, knife-shaped spatulas, made of some composition similar to platinoid. Or it may be German silver (whatever that is). At all events, I have discarded the use of steel, because formerly I often noted rust-colored discolorations on my models, which no longer appear, since abandoning the steel knife.

After the plaster has flowed into all the tooth impressions I then tip the impression up so that the plaster will flow away from the tooth parts towards and over the roof, allowing the excess to drip back into the plaster cup (Fig. 10). By this time the plaster will have begun to set and the operator must work rapidly. The impression should be examined, and while no air should have been imprisoned in the tooth impression, should any such bubbles appear, they should be pricked with a small camel's hair brush and the impression then quickly filled with the setting plaster. At this stage I use a ferrotype plate, which is a piece of metal, coated with black enamel, used by photographers for mounting prints. Plaster separates from it easily, and it is readily sponged clean. The impression being filled, an additional quantity of plaster is placed on the ferrotype plate, the impression turned over and placed upon this second mass, and the plaster trimmed up to proper shape with the spatula (Fig. 11). There is but one detail of importance to be noted at this point, and that is, that sufficient plaster must be added to make the model quite wide at the back corner, as seen in the illustration in which the back part of the poured

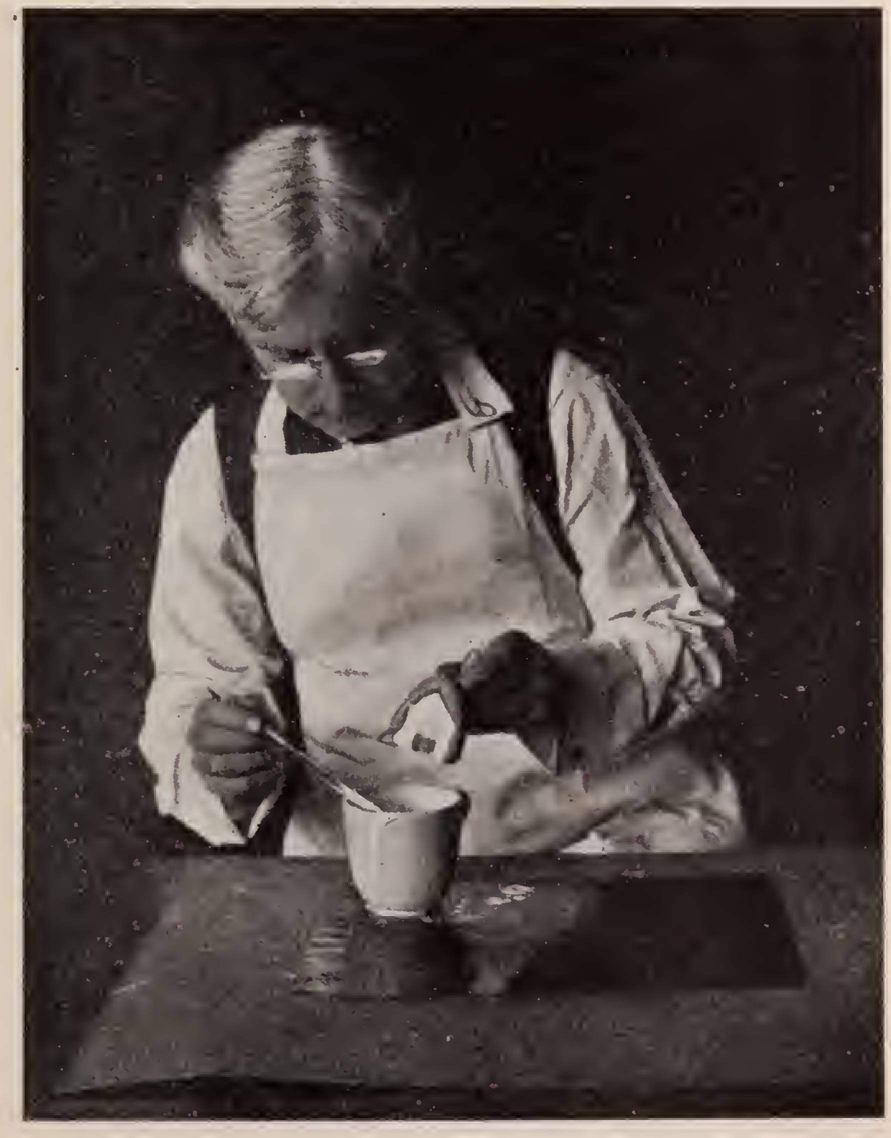


Fig. 10

model is presented. This will be found advantageous when trimming up the models.

### SEPARATING THE IMPRESSIONS FROM THE MODEL

To separate the impression from the model I find it best to allow twenty-four hours to pass when dealing with record models, though working models may be separated as soon as the plaster has sufficiently hardened; often within an hour of pouring.

In dealing with a record model, grooves are cut to facilitate the separation. One groove midway between the margin and the upper surface of the impression, along the buccal and labial surfaces. Another at about the center of the occlusal surfaces of the teeth, and vertical incisions at right angles to these. A section at the posterior part of the buccal area is pried off first. Then a second piece further front, and so on until the entire buccal and labial surfaces of the teeth are disclosed. Then the roof part may be removed, usually entire, in the upper jaw, though it must be taken off in sections in the lower. Pressure should be used so as to press these parts away from, rather than toward, the teeth. Finally, the parts overlying the gum may be pried out, which is usually easy, as these parts were fractured in the original removal of the impression from the mouth.

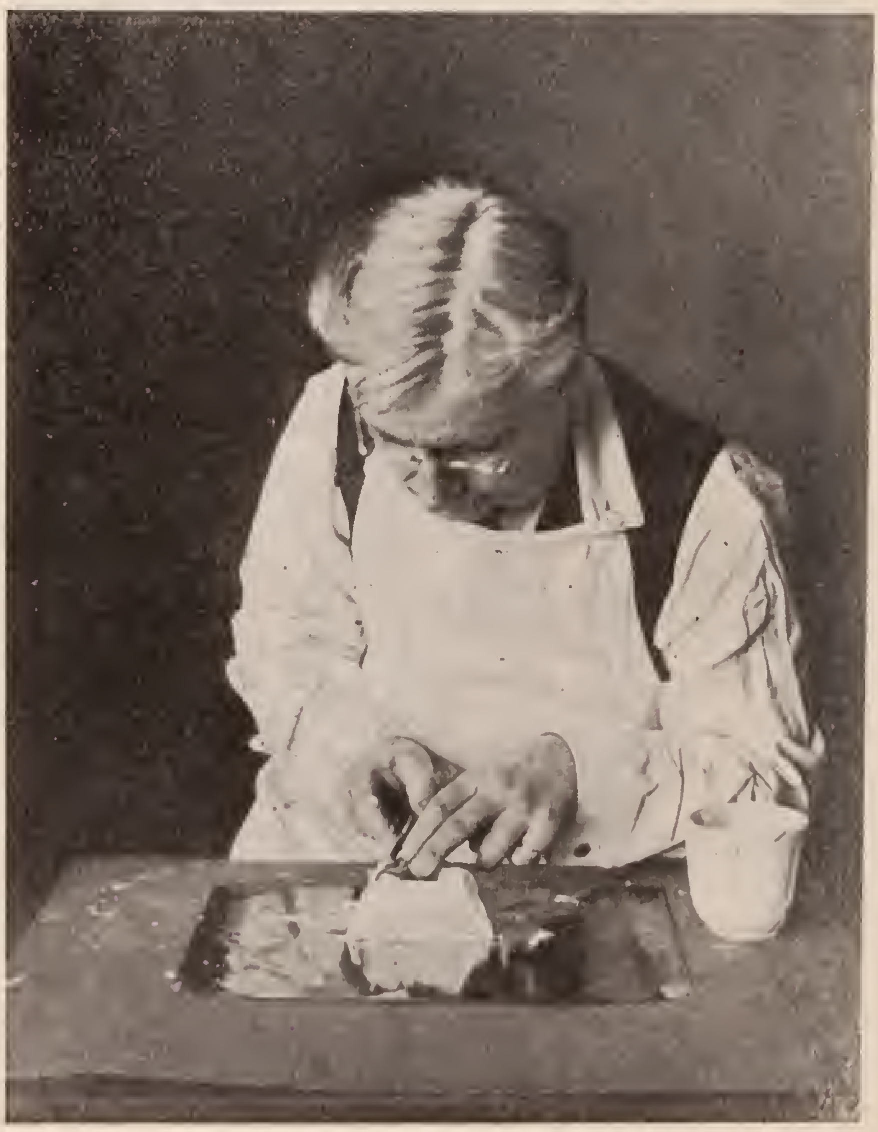


Fig. 11

## TRIMMING THE MODELS

The trimming up of the models is best done at the time of separating, as usually the plaster is then of just the proper consistency to cut with knife, plane, or file. But if for any reason the trimming of the model is delayed, the plaster will harden, and must be made soft again. The model should not be dipped in water. A very little water should be placed in a saucer and the model set in it. The water will be absorbed by capillary attraction, and can be seen to rise as it enters the plaster. As soon as the moisture has reached the region of the gum, the model should be removed from the water, as any excessive wetting will always injure the model.

In trimming up a set of models I first roughly trim the sides in accordance with the well-known angle plan. I then undertake to establish what may be termed a base line. For this purpose I have adopted a purely dogmatic method, which perhaps has no basis in scientific reasoning, but which serves the purpose well enough. First, I spread a pair of compass points one inch apart. In very small mouths it may be one-sixteenth of an inch less and in larger mouths one or two-sixteenths more. But most often it is one inch. I place one point of the compass immediately in line with the buccal groove of the first molar, just at the gum margin, and with the other point I make a prick into the plaster. This is done on both sides. Then the compass points are closed one-sixteenth of an inch, and similar marks are made, measuring from the gum line at the center of each cuspid. The object of shortening the measurement in this way is to slightly elevate the base line in the molar region. With a sharp knife these pricks or dots on the plaster are united by cutting a line, and this cut line is continued entirely around the base of the model. The model is then turned bottom side up and the plaster above the line is cut away on a bevel. This renders it easy to cut away the excess plaster without encroaching upon the established base line, but when the base line is almost reached, the knife may be discarded for a Stanley plane, a small metal carpenter's plane, shown in several of the illustrations. This is better for the bottom and top of the models than the Angle plane, being wider, though the Angle plane will be more useful along the sides. After planing the base fairly smooth it should be made smoother still with a coarse file. At this point it is well to repeat the measurement to be sure that the base line has been established properly, as upon this will depend the good appearance of the two models after the upper model has been trimmed to coincide with the established base.

The upper model is now approximately trimmed along the sides and placed in proper occlusion with the lower model. If a previous set of models of the case has been made, these should be taken from the cabinet and the new set made to conform to the first set in height. If it is the first set of models then a set of models of a similar case may be used as a guide. But in any event, the artistic requirements demand that the top of the models should be at such a height that the part above the gum in the upper model should be sufficient to balance well with the similar part of the lower model.

The desired height of the models having been determined, I use a device presented to me by Dr. Luckey, Jr., of Paterson, for marking the upper line. This device consists of a base and an upright rod on which a pencil carrier travels, which carrier can be fastened at any desired height with a set screw. With the pencil fastened at the desired height a line is inscribed entirely around the upper model. I find this device very convenient, but in its absence the same result may be obtained with a pair of compasses, one point resting on the table and the other inscribing the mark on the models.

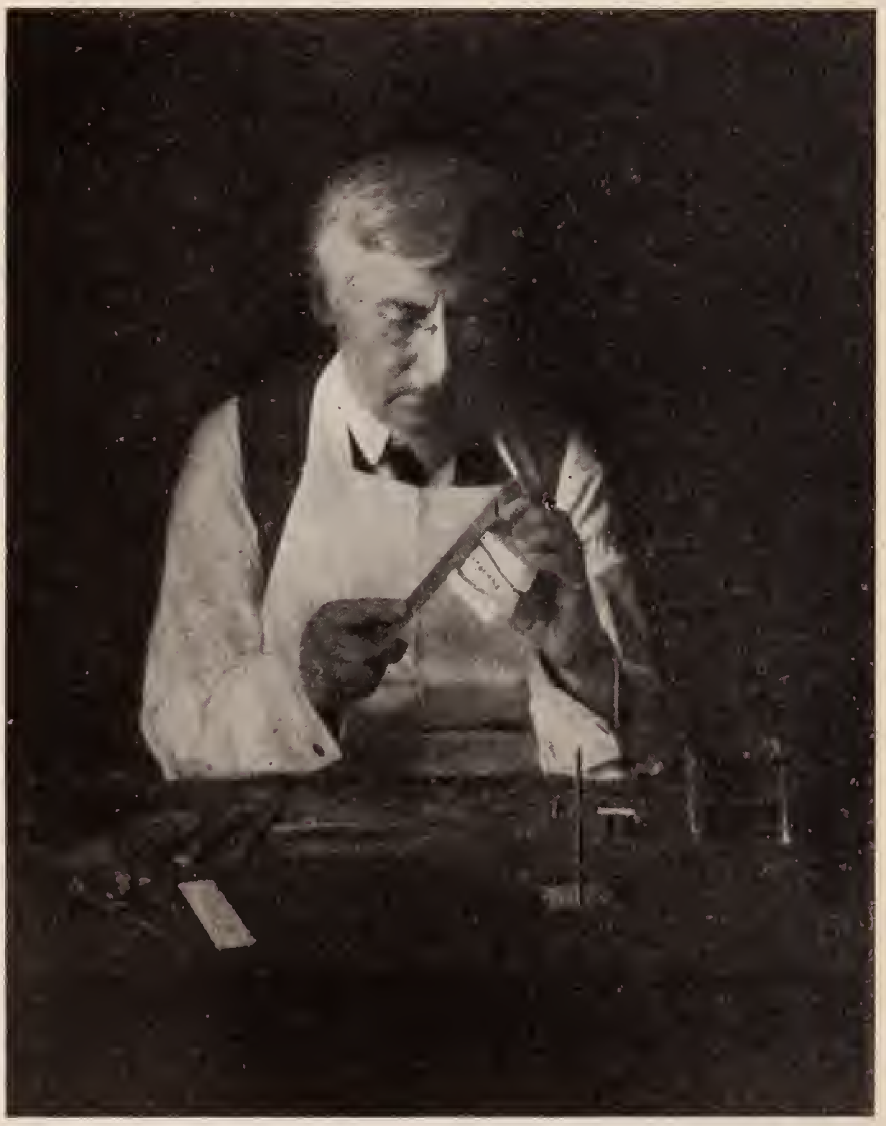


Fig. 12 .

The excess of plaster above this line is then cut away, as was the excess below the base line of the lower model, and the resulting surface is made smooth with plane and file.

The back of the lower model is then trimmed, so as to be at an equal distance from the posterior surface of each molar. The upper model is then again placed in occlusion with the lower, and the back of it is trimmed away and filed so as to conform absolutely and lie in the same vertical plane with the back of the lower model. The two models are held together and the back filled. The posterior corners are then cut away, symmetrically, and both models filed. The side is then cut away so that the anterior terminal of this buccal plane falls in line with the center of the upper cuspid and the front plane extends from this angle to the median line. If possible, the artistic parts of the model should extend sufficiently out beyond the anatomical parts, so that the two models may be held in the hand in occlusion and their sides filed to coincide, without danger of injuring the teeth during the filing (Fig. 12). It is for this purpose that the impressions are built out at the buccal borders, as described in the directions for retouching.

The sides of the models may be squared up so as to rise at right angles from the base by setting the models upon a large glass cube and using the Angle plane, set to cut fine, and handled in such a way that the plane rests partly on the glass and partly against the sides of the model. The sides may then be further perfected by using a very fine file in the same manner. The models we have been working on are seen in Fig. 13.

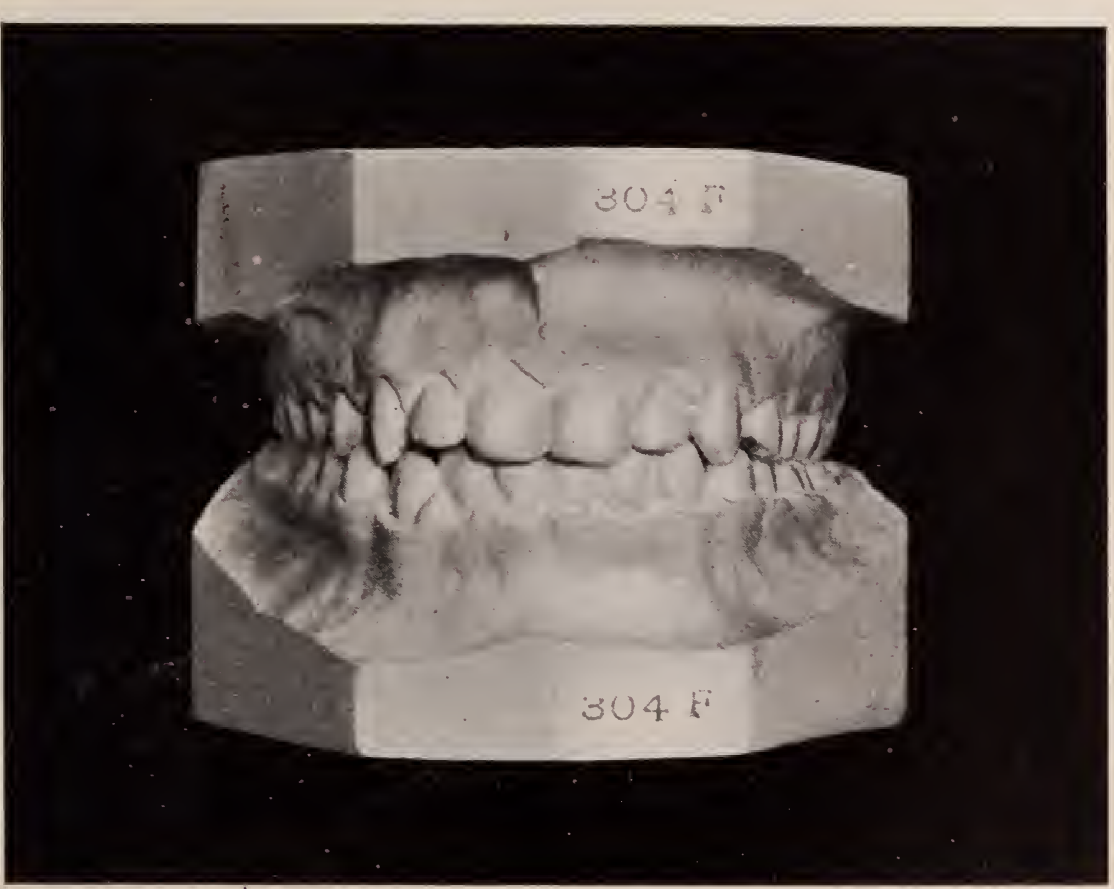


Fig. 13

### FINAL FINISHING, RETOUCHING, AND REPAIRING OF MODELS

Models thus trimmed up are set aside till thoroughly dried. They may then be retouched, as described in relation to treatment of impressions. Air holes may be filled in, missing particles broken from teeth built on, and teeth broken off may be replaced. Two methods of replacing teeth may be described. If the missing part be not lost it may be carefully fitted back into position and so held, while with a sharp bistoury a little of the plaster is cut away along the lingual joint of the break, and this filled in with plaster on the smallest brush. If the part broken off be lost, a small impression of the natural tooth may be taken in Detroit modeling compound, and a new plaster tooth procured in this manner. Then the broken tooth should be cut away from the model, carefully preserving the gum margin. The newly procured plaster tooth should be trimmed up so as to just set in the socket cut in the model, and may be attached to it with the camel's hair brush and fresh plaster.

Should the plaster model show slight imperfections about the teeth and gums, the model should be immersed in water for about five seconds. This will soften the surface sufficiently to enable the operator to remove any excrescent particles of plaster and perfect the outline of teeth and gums. This is best done with dull instruments. I use a plain, right-angled burnisher. If a polish is desired it may be obtained by dusting talcum powder on the surface of the model while it is slightly moist, and rubbing it in with the finger, dusting off the excess with a brush.

## STUDY MODELS AND WORKING MODELS

Study models are models taken during the progress of the correction of malocclusion, and are made with the purpose of observing the existing conditions better than they can be seen by examination of the mouth itself. Usually some sort of appliance will be in position, which the operator does not desire to remove. The impression is taken with these appliances in place.

By working models I mean models taken with molar bands, or other bands fitted to the teeth, the models being taken with the purpose of soldering other attachments to these bands, as, for example, when molar clamp bands have been fitted and the buccal tubes are to be soldered to them.

The technique of taking these impressions differs considerably from that described for record models. In the record models, as we have seen, we desire to reproduce in the models, not only the teeth, but the gums and vault as well. In study models and working models all that is really required is an accurate reproduction of the teeth, with, of course, a little of the adjacent soft tissues. We may therefore hasten the operation by adding a little salt to the water when mixing the plaster. The plaster itself may be stirred, until a distinct stiffening is felt. This indicates that the setting process has begun and consequently, the impression will be in the mouth but a very short time. Under these circumstances, of course, everything must be in readiness for very rapid work. Very little plaster is placed in the tray—just enough to reach the top of the outer edge of the tray and not quite fill the trough, none at all extending over the vault.

Unlike the method previously described, the tray is carried at once to place. It may surprise some to see how good an impression may be obtained with such a small quantity of plaster.

Where molar clamp bands are in position, even less plaster may be used, as it is not desirable to have much plaster set fast about the lingual screws of the bands. Usually it is best in the molar region to have the plaster only in the deeper part of the tray and up along the buccal sides. In Fig. 14 we see an impression of a lower, with molar clamp bands placed in the impression. In the molar regions the lingual flanges of the tray were left entirely free of plaster. In the result we see that the plaster did not entirely encompass the lingual screws, thus interfering with removal of the impression; nevertheless, we observe that perfect impressions of the teeth were procured.

Impressions taken for the making of study models should be permitted to harden in the mouth, and are removed in sections just as when making record models. Impressions for working models may be treated in the same manner, but in consequence of the lingual screws of the clamp bands, it is perhaps as well to remove the impression as soon as the plaster remaining in the cup is hard enough to fracture, and with a little gentle rocking the impression may be removed entirely at this stage of the setting.

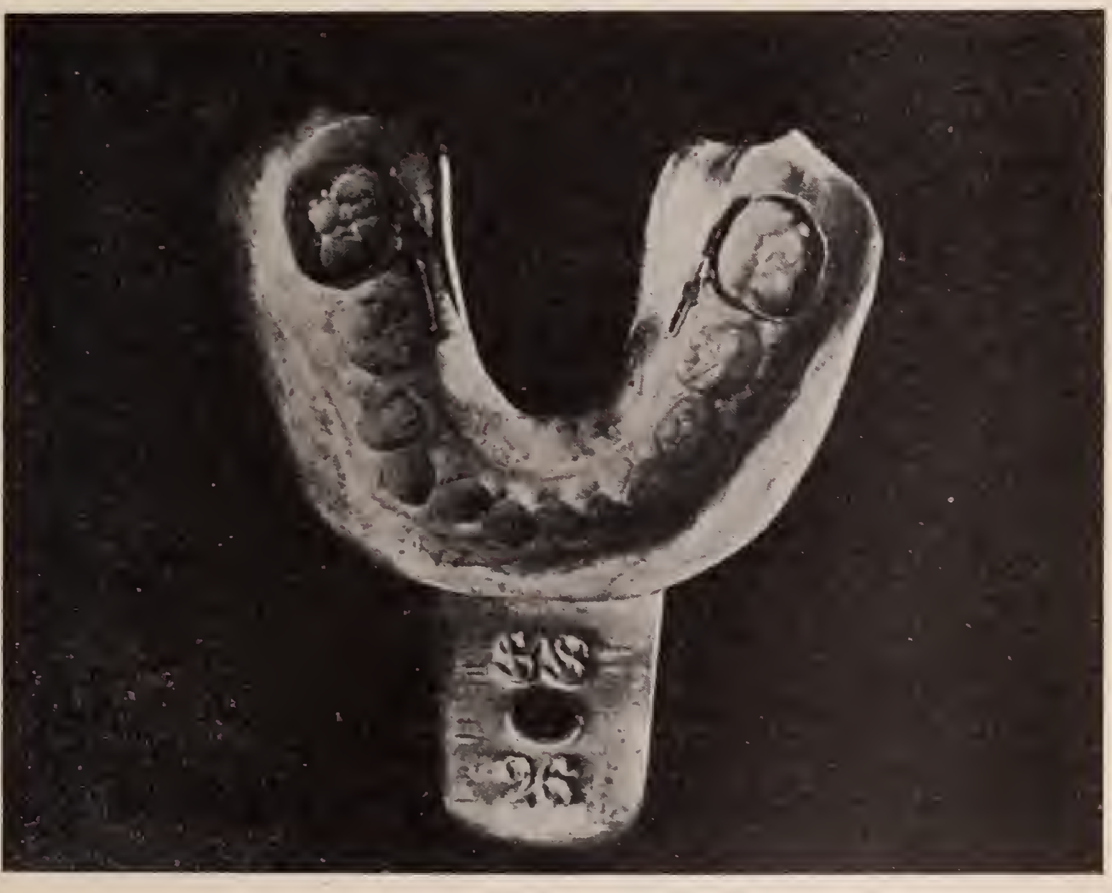


Fig. 14

The separating of the impression from working models is much simpler than when making record models and it may be done usually within thirty minutes of pouring. If the model be poured with Sump, which is of a pinkish color, the procedure is as follows: After removing the tray, the white plaster of the impression is sliced away horizontally with a sharp knife, in thin layers, until the cusps of the teeth just show, the pink of the Sump model rendering this very simple. This may pare off a little of the cusps of the teeth, but that is not of any consequence. The buccal and labial sides of the impression are now very readily pried off, and then the rest of the impression.

A model of this character gives us a reproduction of the teeth with bands in place, and attachments are readily soldered on while still in place on the model. Such models are useful in attaching buccal tubes and fitting the regulating bow at the outset of the case, and also for making retainers at the end of treatment. This method of impression taking and model making is equally applicable to all kinds of prosthetic work, including crown and bridgework.

### DISCUSSION

DR. H. A. PULLEN, Buffalo: I shall discuss the subject as presented by the essayist from two different viewpoints: *First,* as regards the importance and necessity of correct instruction on the subject; *second,* from the standpoint of efficiency of the methods presented, basing the efficiency upon certain standards such as length of time consumed, accuracy of results, etc.

First, as regards the importance of and necessity for good models, the essayist strikes the keynote when he says that "the work of rearranging the human teeth, with its corrected remodeling of the human face, is one of the highest arts," and that "the models used in studying and planning an artistic work should show some evidence of the artistic temperament."

Lacking the "artistic temperament," the orthodontist is not going to show a lack of it simply in model-making, but in every step of his work, so that it will never measure up to the standard.

I will venture to say that the appearance of the models in the orthodontist's cabinet is an index to the character of the work that he is doing, that is, if the models are carelessly made, the other work is slovenly. If the models are carefully and artistically made the results in the practical work upon the patients is proportionately more perfect. In this way, the models become, as it were, an index to personality, which can be easily read by the student of human nature.

Again, a collection of artistically-made models serves as a library for reference and study, which is of far more value to the owner than all the text-books he can purchase, for it is the prima facia evidence of the best results he can obtain, a true and impartial record of the cases treated, for which he can faithfully vouch and from which he can learn the difficulties and vagaries of the subject as in no other way.

Medico-legally, the plaster model is accepted as evidence in a court of law, thereby insuring some protection to the operator from dishonest patrons who may seek to evade their just obligations through some pretext or other.

Apart from the indication of the skill, the experience and the artistic ability of the operator, good models serve a distinct practical purpose, which might have been emphasized in the paper, viz., as a *means of diagnosis,* for comparison with the natural teeth during treatment and for determining not only the problems of dynamics and anchorage but the resistance values in retention.

It having been my privilege to teach this subject in the first session of the Angle School, I have since been more than ordinarily interested in the technique of impression-taking and model-making, and in discussing this paper from the standpoint of efficiency, I shall simply suggest a few changes in the technic presented or add a few methods which have been of value to me.

Taking up the matter of the quality of the plaster, I will say that the impression plaster referred to by the essayist as French's plaster has no equal, but for making casts I believe it to be inferior, because of its quality of becoming soft after the cast has been dipped in water for the purpose of trimming it, also exhibiting this softness in removing the impression by teeth breaking off. I speak of this because the impression plaster is being quite extensively used for casts also, it giving a pure white, smooth cast, but in my opinion, its lack of the quality of hardness is sufficient evidence of inefficiency to warrant its being discarded for a harder cast plaster of inferior grade otherwise.

In taking the impression the essayist spoke of using no ''hastening medium.'' It is true that hastening mediums may do harm by setting the plaster before it is in the mouth and may possibly chemically change the plaster so that the impression is not quite as perfect, but there are times when the reception room is filling up with patients and the necessity for using a ''hastening medium'' is paramount.

As a general thing, however, any hastening of the setting of the impression plaster in the tray gives less time for its proper preliminary placing under the lips and cheeks, and thus a low impression results.

The essayist speaks of using a bone envelope opener for introducing plaster under the fold of the cheek. I would lay stress upon the use of a glass or steel instrument which can be continuously sterilized and which is used only for impressions and not for opening the daily mail also.

In removing the fractured impression from the mouth it is my habit to provide small boxes rather than cards, as the boxes confine the pieces of impression so they cannot be lost, and they can be indexed on a small sheet of paper placed in the bottom of the box.

I disagree with the essayist in assembling the impression immediately, as the fractured edges are softer than they will be later and cannot be waxed together while wet.

Again, it is impossible in the majority of cases to assemble the pieces of impression in the tray, and when it can occasionally be done it takes three times as long to dry it out before varnishing, besides the tray is not easily cleaned after the plaster has been set upon it for a day or two.

The technique of taking the impressions has been very carefully brought out by the essayist, even to the minute details of the operation not usually described in text-books. The essayist lays particular stress upon the backward tilting of the patient's head, the chin being held up, during the taking of the impression, his argument for this position being that the patient cannot swallow while thus posed, hence the least danger from swallowing pieces of plaster and the greatest comfort.

Here again I am forced to disagree with him in part, for while the patient cannot as easily swallow in this position, the tendency of the oral fluids is to run back through gravitation and tickle or irritate the throat in such a way that the patient cannot withstand the impulse to gag. For this reason I should still advise the patient's head being posed in as nearly an upright position as possible during these operations, the saliva thus running forward, where it can be swabbed out by the operator. In this position also there is less danger of pieces of plaster dropping down the throat and frightening the patient. It would seem to me that the position of the head tilted backward and the chin up, as advocated by the essayist, would invite about the worst troubles that we are seeking to avoid in taking a plaster impression.

In varnishing the impressions it might be added that the shellac solution is not a varnish, strictly speaking, but a color line medium, and a pore filler. The sandarac solution is a true varnish and separating medium.

I do not think it a good practice to use the same brush for both varnishes under any circumstances.

Each varnish brush may be held in suspension by a small wire across the neck of the bottle. It must be noted that camel's hair brushes set in metal parts are liable to color the solutions from the corrosion of the brass around the bristles. Those set in quills are to be preferred.

In pouring the impression the essayist speaks of mixing the plaster as thin as milk. If he had said as thin as cream, I think he would have been a little more exact. A thin mix of plaster, however, will produce a cast which is weak and full of crevasses where the water has absorbed out.

In separating the cast from the impression, I prefer to perform this task the same day within an hour, as the greater amount of moisture present assists materially in the operation. A twenty-four-hour wait, as spoken of in the paper, would mean a soaking of the cast before separating.

I believe it is also preferable to shave down the bottom of the impression until the shellac color media is seen at the occlusal surfaces of the teeth before sectioning the impression preparatory to its removal from the cast. In sectioning, also, the cuts should be made down to the color line to be safe.

What I shall have to say further in this discussion pertains to what we usually consider the drudgery of the orthodontist's laboratory. I trust you will note that I said "laboratory," for in these days of fads it has been proclaimed that the orthodontist has no laboratory. Gentlemen, an orthodontist needs a laboratory just as much as a chemist, a bacteriologist or other professional worker, who has certain work to do which it is not desirable for the patient to see and where the operator can be undisturbed.

First in the line of drudgery might be mentioned the filling and opening of impressions, and the essayist having covered this ground completely, I will take up the subject of retouching the cast at this point and trimming the cast next.

In *Items of Interest* for 1900 is an illustrated article of mine on the subject of retouching casts, and certain methods there described I have not had occasion to vary since.

One point in particular upon which I wish to lay emphasis and with which the essayist does not agree, is the fact that a cast should be thoroughly moistened before filling up air bubbles or repairing of fractured teeth. A dry cast absorbs the water so quickly in the process of retouching that a perfect result cannot be obtained.

Broken-off teeth may be replaced by cementing with plaster, as the essayist describes, but care should be taken to cut a crescent-shaped piece from the lingual surface of the tooth, extending the cut to within a line or two of the labial surface of the tooth, preserving the registering fractured edge intact.

Another method is to dry the cast and broken tooth, cement the latter in position, afterward cutting out the cement line and retouching with plaster.

In establishing the base line it is my custom to have the base of the lower cast level with a plane touching the cusps of the first permanent molars and the incisal edges.

The upper cast is then placed on the lower in occlusion and the capital marked to its proper level with the instrument shown by the essayist, which instrument is made and furnished by Ash's, of London, for use with their shooting board and plane, which I will exhibit.

The trimming of models is usually drudgery, but I think I can show you that one can save much time and get considerable pleasure out of this work by the use of a few special instruments.

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The most accomplished liars have been the historians.

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Economically speaking, there are only three kinds of people: the producer, the beggar, and the thief.

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New Thought is the process of trying to convince yourself you are a genius when you know you are not.

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There are two kinds of fools—those who think they are wiser than they are, and those who think they are less wise than they are.

# ALVEOLAR PYORRHEA*

BY R. C. WALDEN, D.D.S., RICHMOND, VA.

IT IS WITHOUT fear of contradiction that I make the statement that our field of labor, the oral cavity, is without doubt one of the most important, if not the most important, to mankind. One may be biased by continuous thought along the same line; but it does seem to most of us who work in this great field, that our work is of the greatest benefit and does the most good to humanity of any of the branches of medicine.

The physician sometimes, where he does not know it, unconsciously acknowledges this, for when a child is born into the world (and ninety-five per cent. are born normal), the first thing the intelligent physician does to keep this child normal is to see that he gets the proper kind of food into his stomach and to teach its mother hygienic measures to pursue in order to keep the child's oral cavity in a healthy condition. Could this hygiene be kept up, and I think the time is coming when it will be a general thing, a vast majority of the ills that flesh is heir to will be prevented, not only by the practice of hygiene, but by the fact that this will insure a perfect masticating apparatus that will put the food into proper condition for the stomach to receive it. Many acute and chronic diseases begin as oral infections.

Infections of the tonsils are due to extensions of germs from the teeth and gums. It is safe to believe that some of the gastric and duodenal ulcers start with or become infected from bacteria swallowed with food infected from the teeth and gums; it is possible that gastritis, intestinal infection, including appendicitis and cholicystitis may at times have origin from the same source; gastric indigestion and auto-intoxication are frequently related to lack of mouth hygiene. Pneumonia, tuberculosis, diphtheria are at times, we believe, caused by the conditions of the mouth.

Drs. William Osler and William Hunter recognize the menace of septic mouths, and attach the greatest importance to filthy mouths as contributing factors to systemic disease. Osler is quoted as saying that in twenty cases of pernicious anemia, pyorrhea was present in more than half, and that more deaths occurred from filthy mouths than from alcohol.

In the April issue of the *Archives of Internal Medicine,* than which no medical journal of higher standard is published in this country, we find an article, by Dr. Frank Billings, of Chicago, entitled, ''Chronic Focal Infections and Their Etiological Relations to Arthritis and Nephritis,'' stating that abscesses of the gums and alveolar sockets, pyorrhea alveolaris, and septic types of gingivitis may cause systemic diseases of various types, and advises skilled dental attention in arthritic and nephritic cases. Life insurance companies will soon begin to recognize the effect of and the decided bearing that unhygienic mouths and loss of teeth have upon longevity.

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*Read before the Virginia State Dental Society, 1912.

Therefore, before our world-wide hygiene movement has produced the great general result that we so much desire, it is our duty as a whole to meet and conquer conditions as they at present exist, while the coming generations are being educated to prevent these conditions. I feel that this is a particularly opportune time to present a paper on a subject which I consider very much in line with this movement.

I am aware that this disease, as old as history, has had a great deal written of it; but a great deal more will be written, for there are signs of a continual increase in the ranks of fighters against its inroads upon the oral organs.

Some of us who have stood aside for years watching others in their fight against it with a great deal of skepticism, have at last entered the field and found to our astonishment that not only can pyorrhea be cured, but teeth heretofore sacrificed may be used as abutments for bridges, giving the mouth a perfect masticating mechanism that adds not only to the health of the mouth, but to the health of the entire system.

The dental profession, like that of surgery, originated in a barber shop, and, like surgery, has some black sheep in the flock; but upon the whole it has increased in dignity and usefulness until its importance and accomplishment place it second to no profession. As surgery has found its stumbling block in cancerous growths, so has dentistry in pyorrhea.

Some of us believe and some know that we can cure pyorrhea; and I hope that the time is coming when all of us will know it. It is our hardest fight, but it has to be done, it can be done, and though there are failures, as in all other branches of medicine and surgery, due to lack of knowledge, due to the fact that death cannot forever and always be forestalled, and also due to the lack of co-operation on the part of the patient, there can be no excuse for our lack of fight, and our tendency to lay down at the time when we should be doing our utmost, and trying anything and everything to relieve the human race of this great scourge, which we see getting a greater hold each year. Just think of the harm done to one's intestinal tract from the constant swallowing, hour after hour, of a few drops of pus, let alone the harm done by imperfect mastication.

This disease, as you all know, was first recognized and attention directed to it by Dr. Riggs, and was for some time considered only a trouble that advanced age was heir to; but with the progress of civilization (it seems to be a disease dependent upon higher civilization), the effects become evident at almost any age and are seen in the mouths of children at the early age of ten or twelve.

In the treatment of pyorrhea (like tuberculosis, cancerous growths and other malignant diseases) the early recognition of its presence and the proper co-operation of the patient are half the battle. Therefore, we will give this paper a broad field, and consider all conditions in which the marginal alveolar process is being affected or destroyed, as pyorrhea. I would like to go even farther and consider all conditions that tend to the production of pyorrhea as pyorrhea, and correct these tendencies, for in nine cases out of ten it will appear sooner or later. Especially is this the case when the normal occlusion has or is likely to become disarranged from the loss of one or more of the permanent teeth.

After fifteen years of close study and observation of this disease I am firmly convinced that it is purely a local affair and can be treated as such. Pyorrhea seems now to be proven to be a great factor in the production of diseases that heretofore have been blamed as the cause of it. Take for example the overworked uric acid theory, which we all know today as a fallacy. It is safe to say that improper cellular metabolism is due more to pyorrhea than pyorrhea is due to this perverted function.

The alveoli have become a point of weak resistance to the attack of micro-organisms from various reasons: Extractions which affect the normal occlusion, abnormal articulation due to overcrowded or malformed arches, ill-fitting bridges, crowns, artificial dentures, overlapping cervical margins of fillings, or any fillings where the proper contours are not preserved, allowing the accumulation of foodstuffs in the interspaces; but chiefly, I think, is pyorrhea due to the lack of having the work to do that nature originally intended that the teeth and alveolus should do. Man was not born with a tooth brush in his hand, nor do these brushes, like the apple, grow on a tree, but the food that was provided by nature was of a class that not only gave the teeth the amount of necessary work and kept them mechanically clean, but also gave the membranes the stimulation of a massage that we today try to duplicate by artificial means.

This is all evidenced, not only in pyorrhea, but by the fact that we rarely see an arch today that has had enough development from exercise, to receive its full complement of thirty-two teeth.

To digress a minute. I had the pleasure, a short while since, to read a prophecy of a dentist, written some sixty years ago, in which he prophesied that the greater and higher we become civilized the smaller the jaws would become, and the effect that this would have in causing overcrowded and impacted wisdom teeth would be so far-reaching that there would be no telling to what extent it would effect the human structure, or the trouble that would result therefrom. I can cite you instances of insanity, blindness and nervous affections that seem almost incredible from this cause and instantly relieved by extraction of these teeth. Therefore, summing up the situation, I think that we can go ahead and treat this disease locally and get good results in the majority of cases.

I have no patience with the idea that syphilitic or mercurial pyorrhea cannot be cured, for I have gotten as good results in this form as in the others, no matter whether it was a new or an old syphilitic case.

It is not my purpose in this paper to go deeply into the treatment of pyorrhea, but to stimulate a greater interest on the part of the general practitioner and induce him to take up in greater earnestness the treatment of true pyorrhea alveolaris, for anyone who treats this disease in its worst forms cannot but recognize it in its incipiency and will therefore see that measures are taken to prevent its full development.

### SURGICAL TREATMENT

Surgical treatment of this disease consists of the thorough removal of all calcareous deposits, curetting away all carious bone and pus pockets, or by dissolving the carious bone and cauterizing the pockets with aromatic sulphuric acid or phenol-sulphonic acid, this to be followed by antiseptic treatment and massage. The removal of pulps when indicated and splinting and bridging when they are necessary.

My observation has been that exceedingly few dentists attempt to treat pyorrhea. There is a woeful lack of confidence on the part of the young graduate, even from our best schools, to undertake such treatment, giving evidence of a lack of sufficient and proper training of these young men in the treatment of this dread disease that is destroying more teeth than caries.

It is time for the profession to wake up and meet the demands of the public, that is clamoring for this treatment, and not to be constantly proclaiming that "extraction and plates" is all there is left to be done.

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## THE TECHNIC FOR MAKING VACCINES AND FOR USING THEM*

BY G. D. LAYMON, D. D. S., INDIANAPOLIS, IND.

I will give the technic of the administration of vaccine, used in the treatment of pyorrhea.

Taking of Specimen: Cleanse the gums with alcohol and massage them so as to obtain the pus from the deepest portion. With a sterilized platinum wire secure a small amount of pus and inoculate an agar tube. Smear the pus evenly over the surface of the agar, place the tube in the incubator and leave for 24 to 48 hours, or longer, if necessary, in order to get a sufficient growth.

Here is the staphylococcus albus. You can tell it by the color. This is ready to make up. After the various steps have been accomplished, we have the finished product. We know approximately the number of germs in each minim of our suspension.

Have the patient roll the sleeve well up to the shoulder, cleanse the back part of the arm with alcohol. Break one of the ampules of the vaccine and with a previously sterilized syringe draw up the vaccine and expel several times, in order to thoroughly mix the suspension. Now draw up the desired amount and inject beneath the skin of the previously sterilized arm. Pinch the skin well up and pass needle, expel contents slowly.

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*Given as a Clinic at Northern Ohio Dental Society, 1912.

Remove the needle quickly and seal puncture with collodin. The operation is now complete. Tell the patient that he should expect a sore arm and the overlying skin near the point of injection to become red. The area of the redness and soreness will vary with the size of the dosage and the physical condition of the patient. Have the patient return in four or five days, and if the reaction has not been sufficiently great, increase the dosage. Inject larger doses of vaccine as the clinical symptoms of the patient demand. Keep up the injecting until no local or general reactions appear. Then you are sure that an immunity has been produced as far as the organisms which you used are concerned.

There are two principal factors involved in immunity: phagocytosis and bacteriolysis. By phagocytosis we mean the engulfing of bacteria by the white cells. By bacteriolysis we mean the dissolving or breaking up of bacteria. Both of these factors can be demonstrated in the test tube. Bacteriolysis is only demonstrated by the aid of the microscope. Therefore, I will not attempt to do this, but will demonstrate hæmolysis, which is identical with bacteriolysis. This is represented by a color scheme. Hæmolysis is the process of dissolving the red blood cells, setting free their hæmoglobin.

(The clinician exhibited a number of test tubes, demonstrating the process of hæmolysis. He also demonstrated the Wasserman test for syphilis).

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# MOUTH HYGIENE—A SPECIAL FEATURE OF THE FOURTH INTERNATIONAL CONGRESS ON SOCIAL HYGIENE.

### INCLUDING PLANS OF ORGANIZATION AND CO-OPERATION

BY W. G. EBERSOLE, M.D., D.D.S., SEC'Y-TREAS. NAT'L MOUTH HYGIENE ASS'N

The dental profession of the world has been honored by an invitation from Dr. Thomas A. Storey, Secretary-General of the Fourth International Congress on School Hygiene, which meets in Buffalo, August 25-30, 1913, to participate in the most elaborate effort that has yet been made towards placing School Hygiene before the world in its true relation to the health, strength and working efficiency of the human race.

This is one of the most important opportunities that has come to the dental profession in its history for the purpose of presenting the various phases of Mouth Hygiene in their true relation to Hygiene in general.

At this meeting will be assembled the largest number of people that has ever gathered in this country for the purpose of considering those questions which deal with School Hygiene. Not only the leading educators and school officials of this country, but of the world, will be assembled on this occasion.

This means that every state in the Union will be represented by educational people, and it is therefore highly important that every section of the country that is doing anything along the Mouth Hygiene line be represented in connection with the Scientific Exhibit dealing with the various phases of School Hygiene.

A large amount of space has been set aside to be devoted exclusively to the exhibition of material dealing with the various phases of Mouth Hygiene. It behooves every dentist that is interested in the Mouth Hygiene movement to see that his state, city or town, has some sort of a display in connection with this work.

The organization of the Mouth Hygiene Literary and Scientific Exhibit part of the program has been placed in the charge of the writer of this article. An extensive literary program has been practically completed for that occasion.

That the Mouth Hygiene exhibit may be in keeping with the importance that Mouth Hygiene bears to School Hygiene in general, I am extending an invitation to the Oral Hygiene Committee of every dental organization in the country to participate in this exhibit. I am making an urgent appeal to each committee to see that its section of the country is represented by some sort of exhibit, setting forth either what they are doing or planning to do in that section.

Where a committee has nothing else to offer, would suggest that they prepare a chart or a large card, preferably black background, with white lettering, and framed in a black frame about an inch in width. The lettering on this card to be large enough to be read at a distance of twenty-five or thirty feet.

In organizing this work I am asking the Oral or Mouth Hygiene Committees of the state societies to assume responsibility for the state exhibit, and requesting all other dental organizations to co-operate with the state committee in making a state exhibit, but requesting that each individual committee present its exhibit as a component part of the state exhibit, but retaining its distinctive feature. The state exhibits to become part of the National exhibit, each state becoming a component part of the National exhibit, but retaining its individuality. The state exhibits will be arranged in alphabetical order so that the guests from any state will have no difficulty in ascertaining what is being done in that particular state.

The chairmen of the various state organizations constitute a National Committee, this committee to include the Oral Hygiene committee of the National Dental Association and the chairmen of the various state committees appointed by the National Mouth Hygiene Association. The chairman of the National Dental Association's committee to be the executive officer of this National committee.

The National Mouth Hygiene Association has agreed to co-operate with the congress to the extent of making its annual literary program a part of the congress's literary program, and is organizing its membership in the various states and cities along the same lines as suggested for the organized dental profession above.

In appointing its committees on exhibits it has followed out the policy of appointing those of its members who are known to be members of the state or local Oral or Mouth Hygiene committees as its representatives. The National Mouth Hygiene Association will also appoint one of its representatives to co-operate with Dr. Gram at Buffalo, in arranging for exhibits.

We wish to call the attention of the profession to the fact that this is a tremendous undertaking on the part of the writer to organize this work along the lines suggested.

I do not have at my command the names of the committeemen of the various dental societies of the country, and am therefore taking this means of notifying these committees of the part that they are expected to take in this work, requesting that they communicate with me at once indicating their willingness to co operate and the style of the exhibits that they expect to make.

I wish to say to the Oral Hygiene Committees that if they are contemplating any work along the Mouth Hygiene lines they should have something in connection with the exhibit to indicate what they are doing or what they contemplate doing, in order that the educational people from their sections of the country may find that they have a live committee in existence.

We would like to the state committees suggest to that they secure a large map of the state and indicate by means of various colored tacks the places and kinds of work that are being done.

I wish to impress upon the various state committees the importance of having their Mouth Hygiene exhibit a part of the National exhibit, because of the fact that those in charge of this work expect to make a presentation of Mouth Hygiene part of the program, which will be so impressive that every person who attends the congress will be deeply interested in the Mouth Hygiene work. To have the exhibits split up and made a part of the states' general hygiene exhibits would do much to lessen the impressiveness of the Mouth Hygiene exhibit.

W. G. EBERSOLE,
800 Scofield Bldg., Cleveland, Ohio.

## NOTABLE FEATURES ON THE PROGRAM OF HYGIENE CONGRESS.

The Fourth International Congress on School Hygiene, and the first to be held in America, at Buffalo, August 25-30th, according to an announcement of the executive committee, will be by far the most elaborate effort yet made in this country toward getting the problem of school hygiene before the world. The first International Congress was held at Nuremburg in 1904, the second at London in 1907, the third at Paris in 1910.

The objects of the Buffalo Congress are:

(1) To bring together men and women interested in the health of school children.

(2) To organize a program of papers and discussions covering the field of school hygiene.

(3) To assemble a school exhibit representing the best that is being done in school hygiene.

(4) To secure a commercial exhibit of practical and educational value to school people.

(5) To publish the proceedings of this congress and distribute them to each member.

In addition there is a plan on foot to effect a permanent organization for the purpose of carrying out school hygiene reforms in all the individual communities in this country, if not all over the world.

One of the interesting features of the Congress will be the presence of delegates representing the community interest in school hygiene, including those appointed by Mayors and Governors, by women's clubs, by school boards, boards of health, by mothers' congresses and charity organization societies and boards of trade. Their help is being solicited with a view of organizing the community in a campaign of school hygiene reform.

The program committee announces a program of two hundred and fifty papers and fifteen symposiums, taking up hygiene from the following points of view:

I. The hygiene of school buildings, grounds, material and up-keep.

II. The hygiene of school administration and schedule.

III. Medical, hygienic and sanitary supervision in schools.

The contributors to the program make up a notable list of speakers, college presidents and professors; state, city and county commissioners of education; teachers and superintendents of public schools; medical college professors; state, county and city health officers; physicians in private practice, engineers and architects.

Special discussions are being arranged on the following subjects: ''School Feeding,'' arranged by the committee on school feeding of the American Home Economics Society; ''Oral Hygiene,'' arranged by National Mouth Hygiene Association; ''Sex Hygiene,'' arranged by the American Federation of Sex Hygiene; ''Conservation of Vision in School Children,'' arranged by the Society for the Prevention of Blindness; ''Health Supervision of University Students,'' arranged by Dr. Mazyck P. Ravenel, University of Wisconsin; ''School Illumination,'' arranged by the Society of Illuminating Engineers; ''Relation Between Physical Education and School Hygiene,'' arranged by the American Physical Education Association; ''Tuberculosis Among School Children,'' arranged by the Society for the Prevention of Tuberculosis; ''Physical Education and College Hygiene,'' arranged by the Society of Directors of Physical Education in Colleges; "The Binet-Simon Test," arranged by Professor Terman, Stanford University; "The Mentally Defective Child," arranged by Dr. Henry H. Goddard, Vineland, N. J.

Various citizens' committees of Buffalo are arranging an elaborate entertainment for the benefit of visiting delegates. There will be receptions and a grand ball, a pageant of school children, and excursion trips to the great industrial plants of Buffalo, and to the scenic wonders of Niagara Falls. The Boy Scouts will act as official guides.

Delegates will attend from every college and university of note in this country, from other leading educational and hygienic institutions and organizations, and from every country in which an active interest is being shown in the welfare of school children, which includes all the leading nations of the world.

The congress is open to all persons interested in school hygiene upon the payment of a fee of five dollars. Application of membership should be sent to Dr. Thomas A. Storey, College of the City of New York, New York City.

President Wilson has accepted the honorary office of patron of the congress. The President of the congress is Mr. Charles W. Eliot, of Harvard University. The Vice-Presidents are Dr. William H. Welch, of Johns Hopkins University, and Dr. Henry P. Walcott, President of the recent International Congress on School Hygiene and Demography, and Chairman of the Massachusetts State Board of Health.

## SOME FACTS OF INTEREST TO MOUTH HYGIENE WORKERS

BY W. G. EBERSOLE, M. D., D. D. S., SEC.-TREAS. MOUTH HYGIENE ASSOCIATION

In the March issue of a number of dental journals of this country there appeared an article which we wrote entitled "Some Things That Should Be Known About the Mouth Hygiene Movement of This Country." In this article we gave something of a resume of the status of mouth hygiene work in this country and set forth some of the important features which led to the formation of the National Mouth Hygiene Association, which was formed for the purpose of having an organization which would permit the members of all professions and the laity to co-operate in spreading the mouth hygiene propaganda.

The work of the association and its plans and policies were explained and entered into quite extensively. In this connection it was announced that the Secretary-Treasurer had been instructed to conduct a ninety-day campaign for the purpose of securing 5,000 charter members from the ethical dental profession, stating that we desired to do this before beginning an active campaign to secure members from among the laity and other professions. It was also stated that immediately following the ninety-day period for securing charter members many of the most prominent and successful workers in philanthropic and uplift organizations would be placed into the field on salary for the purpose of securing membership and funds which would enable the association to carry out its policies in educating the public to know and understand the value of mouth hygiene and to organize the people in the various localities for the purpose of raising funds to establish and maintain suitable dentariums or dental hospitals to care for the worthy poor throughout the country.

At the time this article is being written a little more than half of the ninety-day period is past, but the support and co-operation received as the result of our campaign for membership from the dental profession has been such that the Board of Governors felt justified in closing contracts which secured the services of those people whom they believe would increase the working efficiency of the association to a very marked degree.

First arrangements had been made for the Secretary-Treasurer to devote one-half of his time to the upbuilding of the organization. One of the most important steps that has been taken in the history of the association today in the direction of increasing its efficiency has been the engaging of the services of Francis R. Morison, of Cleveland, as Director of Publicity. Mr. Morison is a publicity expert of some twenty years' experience in just those fields that will be of the greatest value to the association. Mr. Morison has in his employ twenty people, all of whom are experts in their particular line of publicity. Mr. Morison's acceptance of publicity directorship places at the disposal of the association a corps of experts which the association could not hope to assemble without spending a great deal of time and money in gathering available material.

The extent of the publicity work which will be directed by Mr. Morison and his corps of assistants will depend largely upon the support which the remainder of our campaign for charter membership receives.

The Morison organization is prepared to do much or little in behalf of the Association in newspaper or magazine publicity as the association may dictate. The association has been beset by hundreds of appeals for suitable newspaper publicity matter which it could not to date supply. In securing Mr. Morison it makes it possible for our members to have placed at their disposal that kind of publicity material that will appeal to newspapers throughout the country.

One of the most important things that is of interest to mouth hygiene men of the country is that the Fourth International Congress on School Hygiene has arranged for a section devoted to the presentation of the various phases of mouth hygiene in their relation to school hygiene in general.

A large amount of space has also been set aside for exhibit dealing with mouth hygiene propaganda in connection with the scientific exhibits which are being presented in connection with the general school hygiene. The arrangements for the organization of the mouth hygiene section and exhibits has been placed in the hands of the Secretary-Treasurer of the National Mouth Hygiene Association and an extensive program in this line has practically been arranged.

Committees are being arranged in every State and large city in the union for the purpose of securing State and city representation in connection with the exhibits. An effort is also being put forth to have the foreign countries who are dealing with mouth hygiene represented in connection with this exhibit.

Plans are also under way to secure the active co-operation of the Women's Clubs of America. Through Mrs. S. S. Crockett, Chairman of the Public Health Department of the General Federation of Women's Clubs, over seven thousand women's clubs throughout the United States will be invited to co-operate with the congress on school hygiene and the result will undoubtedly be of the greatest benefit both to the congress and to the National Mouth Hygiene Association.

We earnestly solicit the co-operation and support of the dental profession in making a success of this exhibit.

The Fourth International Congress on School Hygiene affords the best opportunity that has ever been offered to the dental profession to place mouth hygiene before the public in its true relation to school hygiene in general.

At this meeting will be assembled the largest number of people that have ever gathered in this country for the purpose of considering those questions which deal with school hygiene. Not only the leading educators and school officials of this country, but of the world will be assembled on this occasion. This congress should be supported by every individual who has interest in the welfare of the public school children of this country.

# CORRESPONDENCE

## New York Letter

At the meeting of the Oral Surgery Section of the First District Dental Society of New York City, the members were given a really wonderful demonstration of what prosthetic dentistry can accomplish in the hands of an expert. A synopsis is printed at this time of Dr. Mitchell's paper and clinic, so that if anyone has an opportunity to see this case they will avail themselves of it.

### SYNOPSIS OF PAPER PRESENTED AT THE ORAL SURGICAL SECTION OF THE FIRST DISTRICT DENTAL SOCIETY, AT THE ACADEMY OF MEDICINE, NEW YORK CITY, TUESDAY EVENING, MARCH 25, 1913.

BY VETHAKE E. MITCHELL, D.D.S.

*Subject*—"The Artificial Restoration of Lost or Missing Tissues in Congenital Cleft Palate."

*Object*—To show by actual demonstration the possibilities of the improvement of voice and speech, in this class of oral defects, by means of an artificial substitute for the missing tissues, and the advantage of such a procedure over surgical operations.

*First*—The origin and causes were briefly considered.

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Dr. Mitchell stated that there were two reasons for attempting to correct the defect: viz., first, the improvement in general health, by restoring the nasal and oral passages, permitting normal breathing; and second, to improve the voice and speech.

The speech and voice mechanism was minutely described, showing the necessity for accurate anatomical reproduction of the parts involved. The failure of surgical operations to bring about these conditions was discussed.

A "Feeding Appliance" was shown by which an infant could be assisted in receiving nourishment, consisting of a soft rubber plate to cover the roof of the mouth, closing the cleft, to which a rubber nipple was attached, allowing normal suction.

A patient, a young woman 31 years of age, with an exceptionally wide cleft was presented, for whom Dr. Mitchell has made an appliance of gold and hard rubber, constructed along anatomical lines, restoring the missing tissues and their functions.

This patient gave a demonstration showing just what Dr. Mitchell's appliance had done for her in the way of improvement in voice and speech.

First, a few of the labials, anterior lingual palatals, posterior lingual palatals, a few awkward combinations of sounds, etc., were given without the aid of the appliance. Then the whole combination was repeated with the aid of the appliance, showing a marked improvement in voice and speech, as to quality, articulation and enunciation.

In order to prove that when the artificial palate is raised by the muscles, the nasal passages are closed, and the breath may be forcibly expelled through the mouth, the patient was asked to blow out a candle with the appliance in the mouth, which was easily accomplished. It was impossible for her to blow out the candle without the appliance.

Further demonstrations were given showing the interference of nasal resonance—demonstrating and proving the absolute necessity of having the nasal passages restored to as nearly a normal condition as possible, as has been accomplished by Dr. Mitchell's appliance.

In order to show what the appliance had done for the development and improvement of the singing voice, Dr. Mitchell was assisted by the patient's vocal teacher.

The singing demonstration was opened by a unique card-buzzing exercise, demonstrating breath control, showing that the patient is now able to blow a steady flow of breath through the lips, exhibiting absolute control of the artificial palate. Several scales of vowels and consonants, arranged so discriminatively in their sequence, in Vocal Art Science, that by their correct use each and every resonator from the tip of the nose to the epiglottis is exercised, gave a marked demonstration of articulation, enunciation, *pronunciation* and resonance.

The patient next demonstrated the practical use of the mechanical appliance in showing the foremost and highest nasal resonance by sustaining ING-N-M at different pitches.

The next demonstration was the rendition of a series of difficult arpeggios, showing the absolute flexibility of the artificial palate. The patient finished the demonstration by rendering two short ballads in a manner which met the hearty approval of the audience.

Dr. W. W. Walker made the request that Dr. Mitchell return next season and repeat the demonstration.

(Signed) W. C. Fisher, *District Editor.*

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## FURTHER DISCUSSION OF THE INLAY CASTING SUIT

BY DR. E. P. DAMERON, ST. LOUIS, MO.

The discussion of the Taggart-Boynton suit goes merrily on regardless of the decision of the Court of Appeals of the District of Columbia, which decision declares the *patent void* and dismisses the suit.

It is true that the jurisdiction of that court extends only to that district in civil cases such as this is, but the vital point is this was a *test case,* so stated by Dr. Taggart and by all those connected with the suit, and the definition of a test case is, that it shall decide for all concerned the validity of the claims in the patent.

Of course, the patentee could sue in any state in the Union, but he would be very unwise in doing so, for the same testimony could be again produced against him and in addition, this court decision be cited as a precedent. Then, too, other witnesses of considerable value could be brought in, so that in the end the patentee would simply be spending his money for naught.

Inasmuch as Dr. Taggart practically vitiated his own patent by his own testimony, wherein he showed that he had been making patterns for fillings for ten years and casting fillings from these patterns—see court decision on page 133, 2nd column: "Indeed, Dr. Taggart himself, according to his own testimony, was in possession of the idea involved in these claims more than ten years (only two years are allowed for experimentation) before he applied for his patent, etc.,"—it would seem the height of folly for him to again sue on the claims involved on the Boynton suit, that is, the making of wax patterns and the mold.

When this suit was first brought it was both on the process for making patterns and for casting from them—but the first day in court, attorney for the patentee withdrew the casting part of the contention. Casting into concealed molds is "older than the hills." All kinds of casting has been done by people in all ages into concealed cavities and by pressure—the Igorrotes from the Philippines used pressure to cast brass pipes; Dr. John Carroll cast aluminum plates with pressure—all the witnesses in this case used pressure to cast and they used gold in the process of casting. The patent tested in court was his *Basic patent* and it is extremely unlikely that his inlay patent (No. 983,579) can be established. It has been charged that Boynton attorneys found a weak spot in the patent and took advantage of technicalities, etc. The whole patent is weak in that others have taken every step claimed therein more than two years prior to the time he applied for the patent.

A very important point to be considered is that the "prior record art" was not utilized by the court in making the decision—that is, what has been done in foundries by jewelers, silversmiths, etc., throughout the world in casting into concealed molds. The case was decided on what dentists have done prior to the time the patentee did it.

Indeed, the patentee, after filing suit, was most dilatory in conducting it to a conclusion and seemed to hesitate or to fear to come to a decision, and this is not to be wondered at when his attorney stated in court his willingness to have the testimony of two out of five of his "expert witnesses" "stricken out" in regard to the clinics given by one of Dr. Boynton's witnesses. The patentee has other patents said to cover machines and appliances which he is endeavoring to establish through a suit filed in Chicago. If he patents machines and appliances there can be no objection to his doing so for it places no tax upon the workman's manipulative skill as does the patent now declared void and the one covering the inlay itself, which he may, but will most unlikely, seek to enforce.

It is to be regretted that members of the profession could become so divided in opinion upon an issue so vital to the profession as a whole, and it is to be hoped that in the near future laws may be enacted prohibiting the granting of such patents, thus ending for all time the necessity for such controversy as has been agitating the dental profession for several years.

**It is easy to hustle**
**From morn till night,**
**But it's hard to do nothing**
**And do it right.**

# EDITORIAL

## TO WHAT EXTENT CAN DENTAL CARIES BE PREVENTED BY SELECTION OF FOOD?

For centuries more or less has been written about the care of the teeth and the prevention of dental diseases, but dental caries still exists. And this in spite of advanced ideas of the origin and cause of this destructive disease. Regarding the prevention of dental caries, Fox, nearly a hundred years ago, wrote that "this delightful secret, although it is pretended to in the advertisement of every quack, we can only expect to acquire when the philosopher's stone and the grand panacea have been obtained."

Dentists generally have seemed to be of the same opinion and have given more thought to filling and restoration of the teeth than they have to the prevention of dental caries. They have been content with recommending the hygienic care of the teeth and mouth as the best means of prevention of dental disease. Some of our dentists, however, have gone farther in their investigations of the subject and have given some suggestions that should be an aid and stimulus in dental research work, such as the National Dental Association is about to establish. For instance, Dr. J. Sim Wallace, London, Eng., has been giving the subject special attention for the last ten years. In his recent book, *The Prevention of Dental Caries,* he states that "dental caries is one of the most easily and certainly preventable of diseases, and there would seem now to be no valid excuse for the bringing up of children with decayed teeth, together with all the pathological results which they give rise to."

The author says, "It is now generally recognized that the fact of the prevalence of caries in some mouths and not in others (and all partaking of a mixed diet), is by no means necessarily a proof that there is any more susceptibility or immunity to the disease in the one case than in the other. Some now believe susceptibility and immunity in regard to dental caries is, if not a misconception altogether, at least an almost negligible factor, which, at the present day, throws no light whatever on the means at our disposal to prevent disease."

Recognizing that the cause of caries is the prolonged retention or stagnation of fermentable carbohydrates in more or less immediate contact with the teeth and undisturbed by the free access of saliva, the author says that "when we observe what actually happens during mastication, we see that it is chiefly food of a fibrous nature which stimulates efficient mastication. The more or less liquid part and suspended particles contained in the fibrous meshes are expressed and swallowed, while the fibrous part is again and again subjected to crushing and disintegration between the teeth, stimulating mastication, insalivation and dislodgment of food particles and bacteria. Fibrous foods which stimulate efficient mastication clean the bacteria out of the mouth altogether to a great extent. They remove sticky carbohydrates, remove also the nutriment which is most necessary for the development of bacteria most active in a carbohydrate medium, i. e., (*a*) acid-forming bacteria, and (*b*) bacteria which give rise to viscous fermentation. This latter class of bacteria is often overlooked, but inasmuch as it is only when the acid formed by bacteria is protected from neutralization or dilution with the saliva that decalcification of the enamel results, it is obvious that viscous fermentation must be reckoned with and should not be allowed, much less encouraged in the mouth.

While, therefore, by no means claiming that the mouth could be sterilized, we may at least say that foodstuffs can control the microorganisms so effectually that the teeth of civilized man may be so clean and free from caries as are the teeth of the lower animals, or certain savage races which do not use any artificial methods of cleaning the mouth.''

H. P. Pickerill, M.D., M.D.S., Director of the Dental School in Otago, N. Z., in his recent book, *Prevention of Dental Caries and Oral Sepsis*, lays much stress on a combination or sequence of salivary depressants and excitants to reduce fermentable debris remaining in the mouth after a meal. In his experiments substances which were known to produce most acid were eaten and then followed immediately by other substances which had been shown to result in an alkaline reaction. The tests showed either a neutral or alkaline reaction, and he says, ''that by such a sequence the deleterious effects of acid-forming substances can be completely overcome and an acid result transformed into a neutral or alkaline one. This, obviously, is of the utmost importance as a physiological means for the prevention of caries, and offers a most simple and efficacious method whereby the commencement of the process of decay may be obviated.''

He further states that in order to prevent the retention of fermentable carbohydrates on and between the teeth, and so eliminate, or very considerably reduce, the carbohydrate factor in the production of caries, starches and sugars should on no account ever be eaten alone, but should in all cases either be combined with a substance having a distinctly acid taste, or they should be followed by such substances as have been shown to have an ''alkaline potential;'' and the best of these are, undoubtedly, the natural organic acids found in fruits and vegetables.

The author maintains that fruit salad or any fruit in season should terminate the meal and suggests that the last thing at night, children and adults, too, should always eat a small portion of some detergent and acid fruit, such as orange, apple, pear, or pineapple. His experiments show that fruits eaten at the end of a meal excite the salivary glands, resulting in an increased flow of alkaline saliva, which persists for some time afterward, thus neutralizing any acid formation on the teeth.

These investigations are worthy the attention of dentists generally, and especially those who are engaged in dental research work.

# NEW PUBLICATIONS

*The Prevention of Dental Caries and Oral Sepsis* (being the Cartwright Prize Essay of the Royal College of Surgeons of England, 1906-1910, with some additions). By H. P. Pickerill, M.D., Ch.B., M.D.S. Birm., L.D.S. Eng., Professor of Dentistry and Director of the Dental School in the University of Otago, N. Z.; London: Bailliere, Tindall & Cox, 1912. Price in the United States $2.75. S. S. White Dental Mfg. Co., Sole Agents for the United States.

This book contains the results of the author's original investigation, covering a period of six years' research. From this research he has not only deduced a number of important conclusions, but has furnished others with a basis and method for the study of these problems.

After dealing with the historical aspect of the subject, he takes up the Incidence of Dental Caries, The Resistance of the Enamel Surface as Affected by the Disposition of the Teeth; The Enamel Surface, Its Physical and Chemical Properties and Powers of Resistance; The Odontograph; Origin and Significance of Lubrication Lines; Departures from the Normal Structure and their Pathological Significance; Physical Properties of the Enamel Surface; Chemical Composition of Enamel; The Saliva; The Reduction of the Carbohydrate Factor by Physiological Means; The Reduction of the Bacterial and Carbohydrate Factors by Artificial Means; The Inoculation of the Mouth with other Organisms; The Diet of Races Relatively Immune to Caries; The Dietaries of Modern Civilization: Their Errors and Corrections; etc.

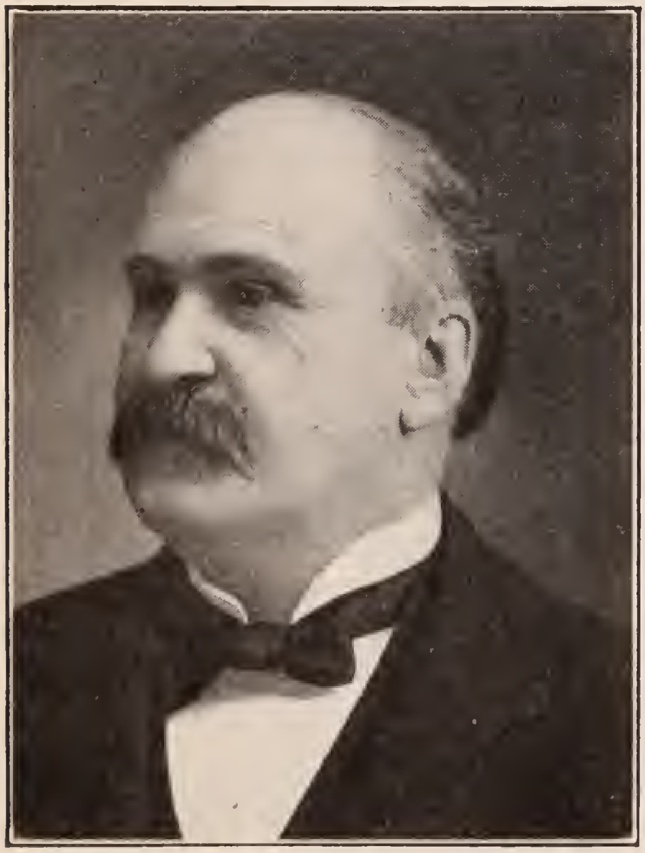
With respect to bacterial plaques, the author says: "They occur on teeth of immune people apparently as frequently as upon teeth of susceptible persons. . . . . If the film of organisms is the essential origin of the acid it would tend to constantly remove itself by dissolving its base of attachment. The saliva, which almost immediately permeates all food upon mastication, contains millions upon millions of organisms capable of transforming carbohydrates into acids. Why is it then necessary to look to any particular glands for the formation of that acid? We therefere come to the conclusion—(1) That bacterial plaques upon the teeth are not an essential factor in the causation of caries; (2) That the lodgment and infection of carbohydrate material is the essential factor, and that those circumstances which afford the formation of bacterial plaques upon the teeth also afford the lodgment of carbohydrates, and so the occurrence of the two usually coincides. Therefore it is evident that the two essential attacking forces in these conditions are (1) acid-forming organisms of the mouth, and (2) the presence of fermentable carbohydrates—the first active, the second passive."

The author states that "the saliva is a fluid extremely variable in its composition and amount, but that those variations do not occur without reason, but rather in obedience to fixed and definite laws and in response to certain ascertainable stimuli. That practically all the normal constituents of saliva are, if present in sufficient amount, of value and importance in protecting the teeth against the occurrence of dental caries and in maintaining the health of the oral mucous membrane. That *acids*, and particularly the natural organic acids, are the stimulants which excite the greatest amount of these protective substances per minute, and, moreover, give rise immediately, and for a considerable time afterwards, to an increased alkalinity of the mouth. That in the saliva is provided a natural and potentially perfect mouth-wash acting continuously. That it is, moreover, completely under control; that it may be altered or varied in amount or composition; that its beneficial effects may be increased or decreased absolutely at will.''

He further says, ''That in order to prevent the retention of fermentable carbohydrates on and between the teeth, and so eliminate or very considerably reduce the carbohydrate factor in the production of caries, starches and sugars should on no account ever be eaten alone, but should be combined with a substance having a distinctly acid taste, or they should be followed by such substances as have been shown to have an alkaline potential; and the best of these are the natural organic acids found in fruits and vegetables.''

The author closes with a chapter on Educational Measures and the Need of Special Legislation. It is one of the most important books that has appeared, and should be read to be appreciated, as little idea of the value of its contents can be given in a brief review.

# OBITUARY



Dr. S. B. Hartman.

Ft. Wayne, Ind., April 25.—Dr. S. B. Hartman, one of the oldest practicing dentists in Fort Wayne, and a life-long resident of this city, died suddenly late Friday night at the family home, 2548 Broadway, at the age of sixty-four years. Death was due to heart disease. He had been in ill health for some time, but his condition had not been regarded serious, and he attended to his professional duties Friday and was apparently in his usual health.

Dr. Hartman had actively practiced dentistry in Fort Wayne for thirty-five years, and for many years occupied offices in the Schmitz block, corner Washington boulevard and Calhoun street. Recently he moved his office to the family residence on South Broadway.

He was born in Fort Wayne October 5, 1849, and had lived here all his life. He was a son of the late Rev. and Mrs. D. P. Hartman. Surviving besides the widow are two sons, Rev. L. O. Hartman, of Chicago, a member of the Sunday school board of the Methodist Episcopal Church, and Dr. E. B. Hartman, of Toledo.

He was a member of Sol D. Bayless lodge, F. and A. M., and of Fort Wayne lodge, No. 14, I. O. O. F. He was also a member of the Wayne Street Methodist Episcopal Church, and was actively identified with the Isaac Knapp Dental coterie, of Fort Wayne.

# SOCIETY·ANNOUNCEMENTS

### Indiana State Board of Examiners

The next regular meeting of the Indiana State Board of Dental Examiners will be held in the State House at Indianapolis, beginning Monday, June 9th, at 9 a. m., and continuing to Saturday, June 14th. All applicants for registration in this State will be examined at this time. No other meeting will be held until November. No temporary licenses are issued.

The new law requiring the annual registration went into effect May 15th. The first registration will take place in December of this year. For application blanks and further information apply to the Secretary,

F. R. Henshaw,
507-8 Pythian Bldg., Indianapolis, Ind.

### National Association of Dental Examiners

The Thirty-first Annual Session of the National Association of Dental Examiners will be held at the Baltimore Hotel, Kansas City, Mo., beginning July 7th, at 10 a. m., and continuing until adjournment.

Every State Board holding membership in the Association is earnestly requested to have at least one representative present at this session. Members of all State Boards are invited.

Hotel reservations should be made immediately.

John P. Stiff, *Pres.*,
Fredericksburg, Va.
T. A. Broadbent, *Sec'y.*,
15 E. Washington St., Chicago, Ill.

### New Jersey State Board of Registration and Examination

The New Jersey State Board of Registration and Examination in Dentistry will hold the semi-annual examination in the State House at Trenton, N. J., beginning Monday, June 30th, and continuing Tuesday, July 1st, and Wednesday, July 2nd. Practical work, Monday, June 30th, 8 a. m. Theoretical examination, July 1st and 2nd, 8 a. m. For further information address the Secretary.

Applications must be in the hands of the Secretary five days prior to the examination. The business meeting of the Board will be held at 10 a. m. Tuesday, July 1st.

Charles A. Meeker, D.D.S., *Sec'y.*
29 Fulton St., Newark, N. J.

## Pennsylvania State Board of Dental Examiners

The next regular examination of the Pennsylvania State Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday and Saturday, June 11, 12, 13 and 14, 1913. Application blanks can be secured from the Department of Public Instruction, Harrisburg. Further information can be secured from

ALEXANDER H. REYNOLDS, *Sec'y.*
4630 Chester Ave., Philadelphia.

## Wisconsin State Board of Dental Examiners

The Wisconsin State Board of Dental Examiners will convene in Milwaukee, at Marquette University, on June 16th, at 2 p. m., for examination of applicants to practice in Wisconsin. High School diploma, application and fee of $25.00 must be filed with the Secretary fifteen days prior to above date. Dental diploma to be presented in advance of examination.

F. A. TATE, *Pres.*
W. T. HARDY, *Sec'y.*
422 Jefferson St., Milwaukee, Wis.

## North Dakota Board of Dental Examiners

The next regular meeting of the North Dakota State Board of Dental Examiners will be held in Fargo, N. D., July 8, 9, 10 and 11. For further information address

F. A. BRICKER, *Secy.*
Fargo, N. D.

## Wyoming State Board

The Wyoming State Board of Dental Examiners will meet for examination of applicants on the 1st, 2nd and 3rd days of July, 1913, at Cheyenne, Wyoming.

An examination is required of all applicants and only holders of diplomas from reputable dental colleges are eligible to such examination. The Board does not interchange with other states, nor issue any temporary permits.

All applications must be completed and in the hands of the secretary fifteen days prior to the time set by the Board for examinations to begin.

The written examination consists of Anatomy, Physiology, Histology, and Bacteriology, Chemistry and Metallurgy, Oral Surgery, Anesthetics, Operative and Prosthetic Dentistry, Materia Medica and Therapeutics, Prophylactics and Orthodontia.

Hand instruments for operating is all the candidate need furnish.

For further information and application blanks, address

PETER APPEL, JR.
P. O. Box 643, Cheyenne, Wyo.

### Nebraska State Board of Examiners

The Nebraska Board examinations will be held June 16, 17, 18, beginning at 9 a. m., the 16th. Address inquiries to

J. S. Pierce, D.D.S., *Sec'y.*

### West Virginia State Board of Dental Examiners

The next annual meeting of the West Virginia State Board of Dental Examiners, for the examination of applicants for a license to practice dentistry in the State of West Virginia, will be held in Huntington, beginning Wednesday, June 11, 1913, at 9:00 a. m. All applications, together with the fees, twenty-five dollars ($25.00), must be in the hands of the Secretary at least one week prior to the date of examination.

Address all communications to

L. Geo. Beerbower, *Secy.*
Beerbower-Zeller Bldg., Terra Alta, W. Va.

### Northern Indiana Society

The twenty-fifth annual meeting of the Northern Indiana Dental Society will be held at the Great Steel City, Gary, Ind., September 23, 24, 25, 1913. The society will be entertained by the Lake County Society in royal style, and nothing be left undone to make this a fitting silver jubilee meeting. For particulars, address W. LeRoy Meyer, *Secy.*
Rensselaer, Ind.

### West Virginia State Dental Society

The seventh annual meeting of the West Virginia State Dental Society will be held in the assembly room of the Chancellor Hotel, Parkersburg, W. Va., August 13-14-15, 1913. Opening session at 2:00 o'clock, Wednesday, August 13th.

Our new program committee have all thrown their hats in the ring, and they promise the best program ever presented to our society.

The executive council have directed me to urge every member to be present, and if possible bring a new member with you. Mark off (from your appointment book) these days of meeting. Do it now. You will learn something there, and we need you. The place of meeting, the Chancellor Hotel, Parkersburg; the dates, August 13-14-15.

Come, you will find the time well spent, the money (for the trip) well invested.

Frank L. Wright, *Secy.*

### South Carolina State Association

The forty-third annual meeting of the South Carolina State Dental Association will be held on The Isle of Palms, June 25, 26 and 27,1913.

W. Busey Simmons, *Secy.*
Piedmont, S. C.

## Meeting of the Colorado State Dental Association

The twenty-seventh annual meeting of the Colorado State Dental Association will be held at Manitou, Colorado, June 19, 20, 21, 1913. The clinics will be in charge of Dr. A. W. Starbuck, 1340 Arapahoe street, Denver, Colo., who will furnish any information relative to same. Exhibitors desiring space will please address Dr. F. P. Wells, Exchange National Bank Bldg., Colorado Springs, Colo.

All ethical members of the profession are cordially invited to attend the meeting. Any other information will be cheerfully furnished by the secretary.

H. W. LeFevre, *Pres.*
206 Metropolitan Bldg., Denver, Colo.
C. A. Monroe, *Secy.*
302 Mercantile Bank Bldg., Boulder Colo.

## The Columbia-Maryland Meeting

There will be a union meeting of The District of Columbia Dental Society and The Maryland State Dental Association in the George Washington University Medical and Dental Department Building, 1325 H street, N. W., Washington, D. C., June 12, 13 and 14.

An extensive program of clinics, essays, etc., is being arranged, and we expect a large attendance from the State of Maryland and the District of Columbia.

## Minnesota State Association

The thirtieth annual meeting of the Minneapolis State Dental Association will be held in Masonic Temple, Minneapolis, Friday and Saturday, June 13-14, 1913.

Every phase of dentistry will be presented by men of unquestioned ability, from Dr. Raper of Indianapolis, with stereopticon lecture on treatment of root canals, to the effect of pathological conditions of the mouth on systemic conditions, which will be presented by Dr. C. H. Mayo, of Rochester, whose name is familiar wherever medicine is practiced. A large manufacturers' exhibit will round out what we expect to be an unusually large meeting of the organization.

Benjamin Sandy, *Secy.*
636 Syndicate Bldg.

## The Georgia State Society

The forty-fifth annual meeting of the Georgia State Dental Society will convene at Columbus, Ga., June 12, 13 and 14, 1913, beginning Thursday, June 12th, at 11 a. m. Some very interesting lectures and papers will be presented, also an elaborate clinic has been secured.

Further information will be cheerfully furnished upon request from ethical practitioners of other States contemplating a visit to the meeting, to whom a cordial invitation we extend.

M. M. Forbes, *Secy.*
Atlanta, Ga.

### The Utah State

The Utah State Dental Society will convene for its annual session June 23rd and 24th, 1913. We aim to make this meeting the best ever held in the intermountain country.

We are preparing a splendid program for this occasion.

Please address all communications to Wesley Davis, *Pres.*
W. G. Dalrymple, *Secy.*

### The Mississippi Dental Association

The thirty-eighth annual session of the Mississippi Dental Association will be held at Meridian, June 24, 25 and 26, 1913. A fine program is promised and an invitation is extended to all ethical practitioners to meet with us.

Dr. L. B. Price, *Secy.*
Corinth, Miss.

### Southern Branch N. D. A.

The fifteenth annual meeting of the Southern Branch of the National Dental Association will be held at the Chamberlin Hotel, Old Point Comfort, Va., July 22 to 25, inclusive. The Virginia State Dental Society will meet conjointly with the Southern Branch at that time.

Thos. T. Moore, Jr.,
*Cor. Secy.*, Southern Branch of N. D. A.

### Wisconsin State Dental Society

On account of the conflicting dates of the meeting of the National Dental Association, the Wisconsin State Dental Society will meet July 22, 23 and 24, at Madison, Wis., instead of at the usual time.

O. G. Krause, *Secy.*

### National Association of Dental Faculties

The next annual meeting of the National Association of Dental Faculties will take place at the Hotel Baltimore, Kansas City, Mo., beginning at 10 a. m., on Friday, July 4th. The Executive Committee will meet at 9 o'clock on the same morning at the same place.

B. Holly Smith.
Chairman Executive Committee.

### Virginia State Dental Association

The next meeting of this Association will be held in conjunction with the Southern Branch of the National Dental Association at Old Point Comfort, Va., July 22-23-24, 1913.

C. B. Gifford, *Cor. Secy.*

### Washington State Dental Society

The twenty-sixth annual meeting of the Washington State Dental Society will be held in Seattle, June 16, 17 and 18. All ethical members of the profession are cordially invited to attend.

A. D. Remington, *Sec.-Treas.*

## New Jersey State Dental Society

The forty-third annual convention of the New Jersey State Dental Society will be held in the Beach Auditorium at Asbury Park, N. J., July 16, 17 and 18, 1913, beginning on Wednesday, July 16, at 10 a. m.

The exhibits of modern dental appliances and the latest in office and laboratory equipment will be in charge of Dr. William H. Gelston, 40 N. Thirtieth street, Camden, N. J., who will be glad to furnish information regarding rates and space still available. Early application from those desiring to exhibit with us this year will be greatly appreciated.

The clinics will be in charge of Dr. Henry Fowler, 114 N. Fourth street, Harrison, N. J., and will be comprehensive and of a very high order.

Further announcements will be made from time to time.

EDWIN W. HARLAN, D.D.S., *Secy.*,
47 Crescent Ave., Jersey City, N. J.

## American Society of Orthodontists

The thirteenth annual meeting of the American Society of Orthodontists will be held in Chicago, June 30-July 1, 2, 1913.

DR. FREDERICK C. KEMPLE, *Sec'y.*
576 Fifth Ave., New York City.

## National Dental Association

The 1913 session of the National Dental Association will be held in Kansas City, Mo., July 8th to 11th. The reorganization of the association should make this the most important meeting in its history. Every State society that has met since the new constitution and by-laws were adopted, at the Washington meeting, has voted to become a constituent society, and we can all appreciate the influence of such an organization if all the State societies take similar action.

The officers and committees have been active in preparing an exceptionally interesting program. At this date the following literary program is tentatively announced:

Dr. Frank O. Hetrick, Ottawa, Kan., "President's Address:" Dr. Adolph Fenchel, Hamburg, Germany, (subject to be announced later): Dr. Weston A. Price, Cleveland, O., "Scientific Foundation Fund;" Dr. Roscoe A. Day, San Francisco, Cal., "Orthodontia and Its Relation to Dentistry;" Dr. Marcus L. Ward, Ann Arbor, Mich., "Metallurgy:" Dr. Richard L. Simpson, Richmond, Va., "Unbanded vs. Banded Crowns;" Dr. Percy H. Howe, Boston, Mass., "The Saliva;" Dr. Arthur D. Black, Chicago, Ill., "Something of the Etiology and Early Pathology of Diseases of the Peridental Membrane, With Suggestions as to Treatment;" Dr. Hermann Prinz, Philadelphia, Pa., "A Preliminary Report on Action of $As_2O_3$;" Dr. Howard R. Raper, Indianapolis, Ind., "The Value of the Radiograph in the Practice of Modern Dentistry;" Dr. G. S. Junkerman, Cincinnati, O., "Dental Educational Harmony;" Dr. Clarence J. Grieves, Baltimore, Md., "Periapical Infections;" Dr. Burton Lee Thorpe, New Orleans, La., "Prophylaxis;" Dr. H. B. Tileston, Louisville, Ky., "Diagnosis and Treatment of Diseases of the Dental Pulp."

The clinic committee has been very energetic in preparing their program and we have every reason to expect that they will present a very strong list of clinicians. The local committee of arrangements are providing ample facilities for a large meeting and have selected the Baltimore Hotel as headquarters. We are not prepared at this time to publish a list of hotels and their rates, nor to incorporate anything pertaining to railroad rates. Those desiring to make hotel reservations in advance should address the Baltimore Hotel, or the Chairman of local committee of arrangements, Dr. Charles C. Allen, 507 Rialto Bldg., Kansas City, Mo. Information regarding transportation from any point may be secured from any local railroad agent, as they have full information with reference to all rates granted by various passenger associations in their particular territory.

All reputable practitioners of dentistry and medicine are cordially invited to attend this meeting.

Frank O. Hetrick, *President,*
Ottawa, Kansas.
Homer C. Brown, *Rec. Sec'y.,*
185 East State St., Columbus, O.

## Supplemental Kansas City Hotel Information

HOTEL BALTIMORE (Headquarters)—

| | | | | |
|---|---|---|---|---|
| One person, without bath, | $1.50 | and | $3.00 | per day |
| One person, with bath, | 2.50 | " | 6.00 | " |
| Two persons, without bath, | 2.50 | " | 3.00 | " |
| Two persons, with bath, | 4.00 | " | 7.00 | " |

SEXTON HOTEL—

| | | | | |
|---|---|---|---|---|
| One person, without bath | $1.00 | per day | and | up |
| One person, with bath | 2.00 | " | " | " |

THE COATS HOUSE—

| | | | | |
|---|---|---|---|---|
| One person, without bath | $1.00 | to | $2.00 | per day |
| One person, with bath | 1.50 | " | 3.50 | " |

HOTEL SAVOY—

| | | | | |
|---|---|---|---|---|
| One person, without bath | $1.00 | to | $1.50 | per day |
| One person, with bath | 1.50 | " | 2.50 | " |

HOTEL VICTORIA—

| | | | | |
|---|---|---|---|---|
| Single, without bath | $1.00 | and | $1.25 | per day |
| Double, without bath | 1.50 | " | 2.00 | " |
| Single, with bath | 1.25 | " | 1.50 | " |
| Double, with bath | 2.00 | " | 2.50 | " |

HOTEL KUPPER—

| | | | | |
|---|---|---|---|---|
| Single, without bath | $1.00 | and | $1.50 | per day |
| Double, without bath | 2.00 | " | 2.50 | " |
| Single, with bath | 1.50 | " | 2.50 | " |
| Double, with bath | 2.50 | " | 4.00 | " |

DENSMORE HOTEL—

| | | | |
|---|---|---|---|
| Single, without bath | | $1.00 | per day |
| Double, without bath | | 1.50 | " |
| Single, with bath | | 1.50 | " |
| Double, with bath | $2.00 to | 2.50 | " |

HOTEL EDWARD—

| | |
|---|---|
| Rates | $1.00 per day and up |

HOTEL WHITE—

| | | |
|---|---|---|
| Rooms, running water, hot and cold, | $1.00 | per day |
| Rooms, shower or tub bath | 1.50 | " |
| Rooms, outside, bath with tub | 2.00 | " |

The above hotel information has just been received. Would suggest that persons interested make reservation direct with the hotel of their selection.

Homer C. Brown, *Rec. Secy.*

Timidity gets people into greater danger than it avoids.

A man cannot understand himself — how shall he understand others?

A man is really busy when he has no time to tell people how busy he is.

# NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

## Dr. L. E. Custer, of Dayton, Earns a Medal

This is a picture of the residence (see star) and dental office of Dr. L. E. Custer, Dayton, Ohio during the recent flood. Dr. Custer says that he had three and a half feet of water in his office. This picture was taken from the Y. M. C. A. building at 9 o'clock a. m. the first day of the flood and by midnight the water reached the tops of the lamp posts.

Readers of THE DENTAL SUMMARY, many of whom are acquainted, at least by reputation, with Dr. L. E. Custer, of Dayton, will be glad to know that his heroic and self-sacrificing labors during the recent flood in that city are to be fittingly recognized. His name is on the list that has been sent to the Carnegie Hero Fund Commission, and we hope soon to announce that a medal has been awarded to him.

Dr. Custer knew as early as 5 a. m. on the fateful day that the flood was coming and set to work to get his son's motor boat in shape. The engine was out of commission. The boat had no oarlocks, but he found a paddle. Even before it was ready word came to him that a man was hanging to the top of a lamp post two squares away. He managed to cross Main street and the current was so rapid that he was carried down half a block in crossing. He found a man sitting with his feet on the seat of his spring wagon. The seat was tied to the post and he was scarcely in the boat before the wagon moved away. His horse had been taken up a nearby hallway. He said he thought the water was a joke. They hung to the post half an hour before a proper eddy would carry them across the sidewalk to the building. They waited at the building about three hours and saw the Leonard building collapse. A few minutes later word came from the Phillips House that the Rotteman apartments were on fire. There were some forty people in it with no means of escape. Dr.

# THE DENTAL SUMMARY

The Magazine That Helps

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## REGULAR CONTRIBUTIONS

### THE IMPORTANCE OF THE EARLY RECOGNITION OF MALIGNANT DISEASES OF MOUTH AND JAW*

BY CHALMERS J. LYONS, D. D. SC., JACKSON, MICH.

THE SUBJECT which I have been asked to present for your consideration today is "The Importance of Early Recognition of Malignant Diseases of the Mouth." At the outset it will not be out of place, perhaps, to define just what is meant by the term "Malignant Diseases," so that we may not be confused with other pathological conditions, which are sometimes present in the oral cavity.

This term is applied to certain diseases, or types of a disease, which tend towards a destructive or fatal issue; first, it is applied to such diseases as Carcinoma, and certain types of Sarcoma, which, in our present knowledge, inevitably lead to the destruction of life; secondly, to certain varieties of fevers, and other acute affections, such as typhoid fever, scarlet fever, smallpox and cholera, which present peculiarly grave and aggravated symptoms, and ultimately end in death.

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*Read before the Southwestern Michigan Dental Society, 1912.

The part of the application of this term which concerns and should interest us as dentists, is that part which refers to Carcinoma and Sarcoma, or malignant tumors.

In order to comprehend the importance of early diagnosis of these malignant diseases, and the responsibility of the dentist connected therewith, it will not be inappropriate at this time to consider their character, symptoms and progress.

The term cancer and its synonym, carcinoma, was used as long ago as the time of Hippocrates, and was then applied to any new growth of a malignant character. When the broad distinction between the epithelial and connective tissue types of tumors was established by Virchow and others, it was decided to retain the word cancer as the name for the more malignant or epithelial growths, while the less formidable word sarcoma, but in many instances no less serious pathological condition, has been from that time confined to those tumors which have connective tissue for their type. There is an important clinical distinction between malignant and non-malignant growths. A non-malignant or benign tumor is one that grows within a definite limiting capsule and does not invade the neighboring structures. It may grow between them by pushing them out of its way, or the pressure exerted by the tumor upon the neighboring tissues may cause that tissue to atrophy and become absorbed.

A benign or non-malignant tumor never spreads to some distant part of the body by dissemination through the blood or lymph channels. Malignant tumors have no definite limiting capsule. As they grow they tend to infiltrate neighboring tissues.

These tumors spread to distant parts of the body through the blood and lymph streams by a process of disintegration, the cells being carried through these streams; and, becoming lodged at some distant site, they begin to multiply, and a secondary or new tumor of the same character is formed. By this process the whole body may become permeated with the tumor, which inevitably leads to the destruction of life.

Sarcoma and carcinoma are probably met with in the mouth, tongue, or lips as frequently as in any other part of the body, and the dentist should look with suspicion upon any lesion of the mouth not accounted for in the direct pathological results of dental disorders.

Sarcoma is a general term given to non-encapsulated tumors of any of the connective tissues, fibrous tissue, bone, muscle, etc., which infiltrate neighboring tissues, and spread to distant parts of the body through the blood streams.

The habit of invading neighboring tissues constitutes malignancy. The tumor of this type which the dentist comes in contact with most frequently has its incipiency in the tumor which we know as Epulis. This is rather a poor term, for it means any sort of a tumor on the gums.

In most instances they arise from the gingival margin of the gum at the neck of a tooth. As they enlarge they may remain attached to a narrow stalk, or grow along the gum and between the teeth. This growth is slow at first, but becomes rapid as it progresses, and many times will cause a wide separation, and loosening of the teeth. The importance of early treatment of these Epuli cannot be over-estimated, for they may lead to malignancy.

They should be removed as soon as identified, and subjected to a careful microscopical examination. The portion of the peridental membrane or alveolar process to which they are attached should also be removed. This may necessitate the removal of one or several teeth in order to remove them in their entirety, and unless entirely removed, the efforts to obtain a cure will be fruitless.

Blair states, "in a number of immense tumors of the jaw, preserved in the Hunterian Museum of London, the history revealed the fact that they occurred first as small nodules upon the gum. They were repeatedly removed and recurred in the course of years, growing slowly at first, but later taking on rapid, uncontrollable growth that eventually destroyed the patient." Blair states further that it is probable that they would not have recurred at any time during their period of slow growth if a thorough removal had been made of the tumor, with the tissue from which they grew.

In the removal of these growths I have found the large round bur an excellent instrument for the thorough curettement of the tissue to which they are attached, cutting away until healthy tissue is obtained. There is a greater tendency to do an insufficient amount of cutting than there is to do an operation that is too radical.

If the microscopical examination should show the growth to be malignant, a more extensive operation should be planned accordingly, as soon as possible. Dr. G. V. I. Brown, in his book on "Oral Diseases and Malformations," says: "In dealing with malignant tumors of the jaw, both Sarcomatous and Carcinomatous, the decision as to the character of the operation is a grave one, and this can only be definitely decided after a complete microscopical examination."

Undoubtedly many jaws have been resected, and the future comfort of the lives of the individuals blasted, when the growths were benign, and there was no need of a radical operation. On the other hand, to do an insufficient operation in the face of active malignancy is merely to add to the flame and hasten the progress of malignant development.

Probably one of the most complex problems in early diagnosis that the dentist comes in contact with not infrequently is the problem in correctly diagnosing carcinoma or cancer in its incipiency.

The dentist who recognizes these precancerous conditions and who directs his patient accordingly, in my opinion, is as deserving of a Carnegie medal as are those who save lives by the more heroic measures.

When an individual presents with these precancerous conditions present, that person's life and future happiness is absolutely dependent upon the early recognition and treatment of that condition.

This condition is by all means not a simple matter to correctly diagnose. The etiology and nature of cancer in the light of our present knowledge is largely theoretical.

Crile states that although the cause of cancer still remains unknown, many of its phenomena have been carefully studied.

It occurs in every climate and among all mankind, civilized and savage, in wild and domestic animals, carnivorous and herbivorous, in birds, fishes and reptiles, and throughout nature the histological picture of any definite cancer is the same. He says further, although the primary cause is not known, many of the predisposing causes, and precancerous states are known and can be recognized. The growth of carcinoma rarely follows a single wound, but in the visible fields it is frequently preceded by chronic irritation, by scars and ulcers, by chronic inflammation and by pre-existing benign growths.

Age is an important factor in the occurrence of cancer. There is a seeming predisposition or weakened resistance to cancer in persons between the ages of forty-five and sixty-five years of age. It rarely occurs in individuals under the age of forty-five, but when it does occur at the earlier ages, it is non-malignant.

Syphilis plays an important part in the formation of the cancer in the mouth.

Jonathan Hutchins, Jr., informs us that in 30% of patients with epithelioma of the tongue, a history of former syphilis can be obtained; 20% of epithelioma or cancer which are found on the tongue have the site of syphilitic inflammation. Dr. Cyrenus G. Darling's clinical experience in the University Hospital fully coincides with the statistics of Hutchinson. Thus syphilis of the mouth predisposes to and often passes directly into this type of malignant tumor.

What of the responsibility of the dentist in the early diagnosis of malignant diseases of the mouth? Considering on the one hand its invariable outcome unless successfully treated, the suffering of the victim and the improbability of successful treatment in the advanced stages; on the other hand the success or long periods of immunity that may follow comparatively simple early operations, the importance of very early diagnosis cannot be over-estimated.

The study of malignant diseases of the mouth should receive the same careful attention by the dentists that any part of his work is receiving, so that he may be able to look with suspicion upon any unhealthy condition of the mouth, and to ascertain the nature and character thereof. Indeed, in cases of malignant tumors of the mouth, the dentist is usually the first practitioner of the medical art to inspect the case. Blair states, "Until the much-desired cancer specific is discovered it is mainly to the educated dentist, grounded in general oral pathology, who makes a complete though quick survey of the whole mouth, that the medical profession and the public must look to reduce the now increasing death rate from cancer of the tongue."

Assuming Blair's statement to be correct, then it is the moral duty of every dentist not only to examine the teeth of his patients, but to make a quick but thorough superficial examination of the whole mouth, lips and tongue.

Any rough surface on the teeth which is producing a constant irritation should be removed. In cases of chronic ulcers or sores in the mouth, a complete history of the case should be obtained. If the history should lead to former syphilitic affections, or should it develop that the pathological condition was caused by the irritation from inveterate smoking, that condition should be looked upon with grave suspicion, and steps should be taken at once to make a complete microscopical examination, so that a correct early diagnosis may be made.

We must ever keep this in mind: any constantly continued irritation may predispose to malignancy. There is no part of the body that is so subjected to continual traumatism as the mouth, lips and tongue are, for the reason that in the large majority of our patients over forty-five years of age, the teeth are in a more or less broken down condition, and the sharp surfaces of these broken down teeth may cause a chronic ulcer to form, which may ultimately lead to malignant trouble.

If we, as dentists, will keep pace with medical progress, we must not only be skillful dentists, but we must have a familiar knowledge of oral pathology that we may be skilled diagnosticians in those pathological conditions which come within the realm of modern dentistry. If in our dental career we can prolong the life of one patient and are the means of restoring that patient to future happiness, even for a short period of immunity through our being able to make an early diagnosis of a malignant disease, then, indeed, is the practice of dentistry worth while. In so doing we will not be doing more than our duty towards our patients, not more than is expected of us by both the laity and the physician as educated dentists; but in so doing we will have the supreme satisfaction ourselves of having accomplished a purpose in the alleviation of the pain of suffering humanity, by our being able to make a correct and early diagnosis of these malignant diseases.

## DISCUSSION.

R. W. Bunting, Ann Arbor, Mich.: The essayist has called our attention to the most horrible catastrophe which may occur to ourselves or our patients. He has rightly mentioned carcinoma and sarcoma, conditions which, when we reflect upon them, are too terrible to consider with comfort. It is seldom that we discuss this subject. Certainly it is not because we do not meet with these conditions, but rather it must be that we do not desire to talk about them. We consider that they are entirely outside of our sphere, and we do not wish to study them. But the essayist shows us plainly that these cancers and tumors are within our domain, in that so many of them appearing in and about the mouth, can be noticed in their incipiency by the observing dentist. Further, that even highly malignant cancers, when thoroughly removed in time, may be brought to a successful cure, and do not recur.

A long list of causes has been advanced as to the origin of the cancer and tumor. Of these there are heredity, misplaced embryonic tissue, unequal atrophy of tissue, injuries, infections, and chronic inflammation. Many tumors are seen which may be taken as examples of any one of these sources, so that it is not wise to say that they are all due to any one of them. By far the largest number, however, may be traced to that of chronic inflammation. It is to this we must attribute the large number of tumors appearing in and about the mouth.

These inflammations are due to irritations, which are of many kinds. We know that the mouth is the most long-suffering part of the body. The mucous membrane may be cut and bruised one day, and the next there is no sign of an injury. Numberless injuries are given to the mouth by foods and their mastication. The tongue and lips are often burned. Teeth may be decayed, or broken, offering sharp edges to the mucous membrane. Roots may remain in the alveolus and injure and infect the bone. Calculus and food finding lodgment about the teeth irritate the gums continuously. Biting the lips and cheek, smoking, chewing tobacco, and many other conditions chronically irritate the tissues of the mouth. Is it to be wondered at that many tumors are seen on the mouth tissues? And it is indeed from some of these very causes that many carcinomas and sarcomas take their beginning and run their course.

We, then, as dentists, may do a great service to our patients by eliminating every chronic irritant that is in our power to control.

As the essayist has said, all tumors are not malignant. Some are perfectly benign, and would do no harm if they should be allowed to remain. But no one can tell at what time these benign tumors may cease to be such, and take on a malignant growth. Frequently when such a tumor has been superficially excised, it does begin to grow typically. No one but an expert can judge of a tumor by its gross appearance, and he is not safe in its diagnosis. There is but one way. A section should be taken from the edge of the tumor, including normal and tumor tissue, and this sent to a pathologist who is able and competent to make a true diagnosis. When this has been done the surgeon then knows just how grave the situation is, and to what extent he must carry his operation. On the other hand, the man who makes the practice of excising all growths in the mouth and giving them no further concern, will one day see a result of this practice that he will regret the remainder of his life.

As the essayist has said, tumors should be removed early. The benign ones before they have had the opportunity to become malignant. The malignant ones before they have spread along the lymph channels, involving deeper tissues and making their complete extirpation more difficult.

If, by careful watching and constant attention, we may, in the course of our practice, abort one tumor, we shall have saved a life from a hideous death, and it will have been worth while.

Dr. Don M. Graham, Detroit: There is really nothing to add to the admirable paper that has been presented. Few of us realize the importance of this subject and the seriousness of neoplasms about the mouth. Perhaps the average dentist does not see, or at least, does not recognize more than a few cases in a life time. I believe with Dr. Bunting that the only safe way is to make a section of a suspicious growth, send it to a pathological laboratory and on its findings our operative procedure should be based. Up to the present time there appears to be but one hope for the successful outcome of malignant growths about the oral cavity, and this hope is the family dentist. His constant observation and treatment of oral tissues enable him to recognize a growth at its very incipiency, when a majority of these can be successfully removed. After the cancerous elements have extensively invaded the surrounding glands it is very doubtful if any of the highly malignant growths about the mouth can be permanently cured, the opinion of some eminent surgeons to the contrary.

Dr. B. R. Parrish, Battle Creek, Mich.: I wish to relate an experience I had with a patient, who was a farmer, about 47, I should think, who came to my office to have a tooth extracted. I noticed a small growth on the left tonsil, about the size of an acorn, or a little larger. I am always suspicious of any growths or anything out of the ordinary, and after removing the bad tooth I called the patient's attention to the matter, but he only said it hadn't given him any bother. I persuaded him, however, to see a throat and nose specialist, and a microscopical examination was made and found to be a malignant cancer of the tonsil. I sent word to this man to that effect and at first he was inclined to take it as a joke, but he noticed it was growing rapidly and finally decided to have it removed, which was done about three weeks later, but in that time it was almost as large as a hen's egg.

It was my pleasure to assist in the operation (that is, I held the patient's head and held his tongue out by means of a ligature through it). (Laughter). It took about two and one-half hours to do the operation. I would like to mention the fact that the surgeon did not hesitate to cut the side of the cheek open from corner of the mouth to as far back as the third molar that he might get access and more light. At first this might seem like rather strenuous treatment, but I don't know how he could have accomplished the operation without. You will realize that this is a very bloody field in which to work, and at one time during the operation some blood entered the trachea and the patient nearly lost his life. X-ray treatments were given following the operation and several months have elapsed without signs of recurrence. I think we should always have our eyes open to diagnose such conditions that they may have early attention and thus save life before it is too late.

I think Dr. Lyons should be congratulated on his excellent paper. He has stimulated us to think more of our opportunities and the importance of their getting early attention.

Dr. C. J. Lyons (Closing): It is true, as Dr. Graham says, that in the entire life time not more than one or two cases may come under any one person's observation. That is all true. It wasn't my object to try to teach you the removal of these growths. My object was simply to call your attention to these growths and the importance of making an early diagnosis. If, during the entire dental career, only one or two lives could be saved through an early diagnosis of these conditions then I would say that the practice of dentistry is certainly worth while.

About three years ago we had a case which went through the hands of four or five dentists. It was a case that was first diagnosed as an alveolar abscess and was treated as such; and finally this patient got into the hands of a dentist who recognized a malignant growth and sent her to a hospital, and after two operations she was cured. She has not had any trouble for a period of two years, and I doubt of her having any further trouble, although it is possible it may still be there and may yet develop some place else. It may develop in some other part of the body. One half of her upper jaw was sacrificed on account of the operation. Had the dentists first recognized that trouble and sent some of the growth to a pathological laboratory, no doubt but what she could have had a cure without removing one half of her upper jaw. When these tumors are stirred up they grow very rapidly. After the teeth were extracted, it wasn't four weeks until her mouth was in a very serious condition.

Another case: About six months ago, a man about 70 years old presented, who had had a sore on his gum for twenty years. He went to the dentist to have his teeth all taken out. The dentist did not recognize any trouble there and stirred up this growth, and in six months' time it filled his jaw and in four more weeks he was dead. They grow rapidly, and if we can just see these and recognize them in time, you will certainly be doing a great deal of good to humanity.

# COLORING PORCELAIN*

BY E. E. HAVERSTICK, D. D. S., ST. LOUIS.

Illustrated by Miss Margaret Mosby, St. Louis.

DENTISTS HAVE so much to read and so little time in which to read it, that it seems important in writing a paper to be as brief as possible, and this has been the endeavor in this paper. If there is anything not clear it will gladly be explained, even to the extent of coloring a tooth for anyone who will send it marked with lead pencil as he wishes it changed.

The papers which have been written during the past few years regarding new molds for teeth have done a great deal of good.

We now have some new molds for porcelain teeth that resemble the natural teeth more closely than we have had heretofore, and these results, while not perfect, are very gratifying. There is, however, another unsatisfactory condition in porcelain teeth of all kinds which will perhaps be harder to correct than the form of the teeth, and that is the color or shading of the porcelain teeth to reproduce natural teeth.

When we observe a person wearing an artificial denture, the one feature which is most noticeable about it, provided the teeth are set uneven like natural ones, is the one GENERAL COLOR: each tooth exactly like the other in color. This is true, also, of each individual tooth which has no white, brown, blue or yellow spots or streaks, as the case may be, on it. In many cases, this is true of the porcelain crown or the facings for a bridge. Therefore, it is not sufficient that an individual tooth or that a number of teeth match the general color we should like to duplicate, but the individual coloring of the teeth should be reproduced by staining and baking each one in a furnace. In this way are we able, with the present supply of artificial teeth at our command, to produce a crown, a bridge, or an artificial denture which will appear natural in the mouth.

## FIGURE 1

Figure 1 is a plaster model with some natural and some artificial teeth. The coloring cannot be reproduced in a one-tone drawing. The art of staining porcelain teeth to match in color the natural teeth is comparatively easy to acquire. And when once acquired, the time necessary to produce the effects is not as great as one not familiar with the work would expect.

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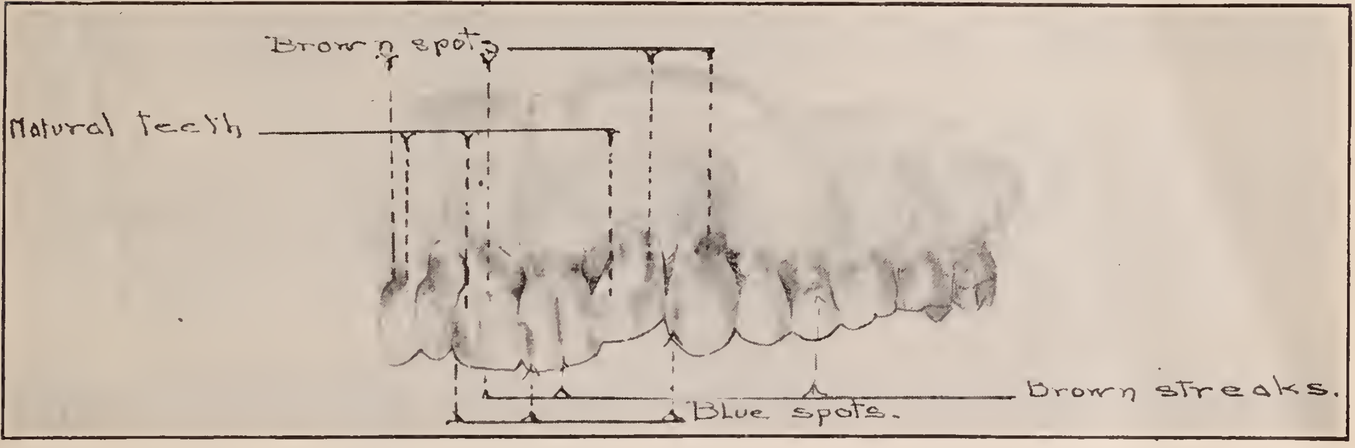
*Read before the St. Louis Society of Dental Science.

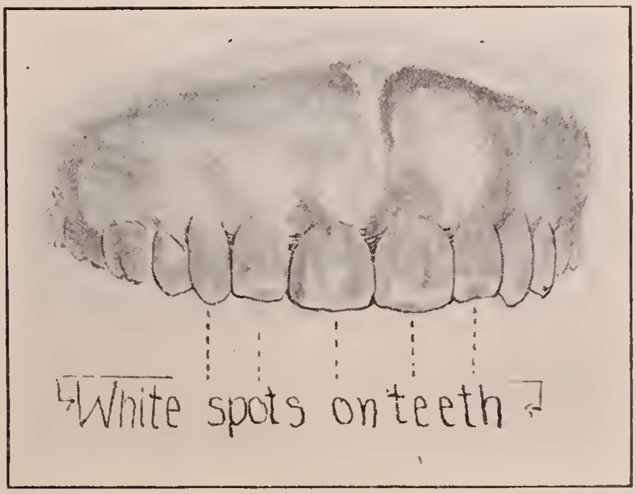
The best results may be obtained by mixing a small portion of the deep-colored mineral stains with the ordinary high-fusing porcelain enamels. In this way we can produce any shade or color we may desire. We can use either a small amount of mineral stain with a porcelain enamel, which itself approaches the shade we wish, or we can use a greater amount of the mineral stain and the porcelain enamel of a lighter color than the shade we wish to produce. The mineral stains alone generally produce a color too deep or decided. And, again, they will fade if they are used alone on a facing that is to go through the heat of soldering, while this bleaching will not occur if a large proportion of high fusing porcelain enamel is used.



Aside from the brown or blue or green color, as the case may be, in the spots or streaks a most artistic effect can be produced in many cases by putting one or two *white* spots near the incisal edge of the teeth. These spots will assist in bringing out the translucent appearance noticed at the incisal edge of natural teeth.

### FIGURE 2

Figure 2 explains the white spots on the labial surface near the incisal edge. A most convenient feature of coloring is the fact that after the case is completed the color may be sandpapered down with disks to any degree of lightness that may be desired. That is, provided the tooth colored



was not too dark originally. And for this reason, and for the reason that a tooth can be made dark in color easier than it can be made light, it is always well to select teeth not too dark.

The spots (Fig. 1) on teeth are not usually at definite places, and that is an advantage to one who wishes to color them. Of course, the brown is generally near the gingival margin, streaks divide the teeth in halves or thirds vertically, and the white spots are frequently near the incisal edges on the labial surface. There are also grey and blue spots along the approximal surfaces of the anterior teeth. It may be said that these grey and blue spots are underfillings, which should be removed, but frequently when persons reach an age where they require this class of work it is not always necessary to remove such fillings and such discolorations are nearly always present. Sometimes a blue or green line runs across the incisors one-third of the way above the incisal edge. This line is of a faint color and about a millimeter in width, as shown in Fig. 3.

Figure 3

Now as to the procedure in the work. All that is needed in order to do this work is a few shades of high fusing porcelain enamels, four shades of mineral stains (blue, yellow, brown and pink), distilled water, a camel's hair brush, an electric furnace, and a pair of pliers to clasp the pins of the tooth while the enamels are being applied. (See Fig. 4).

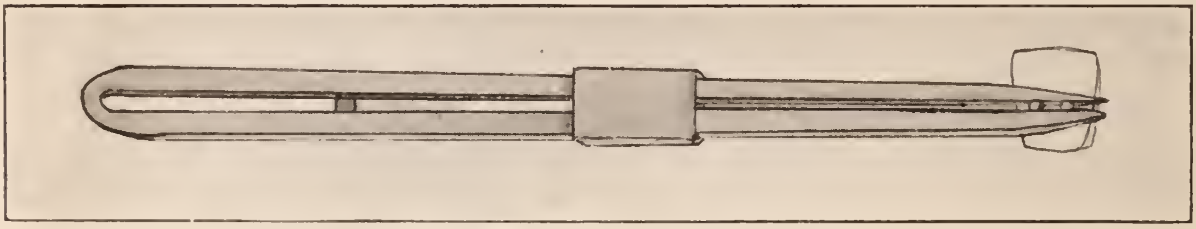
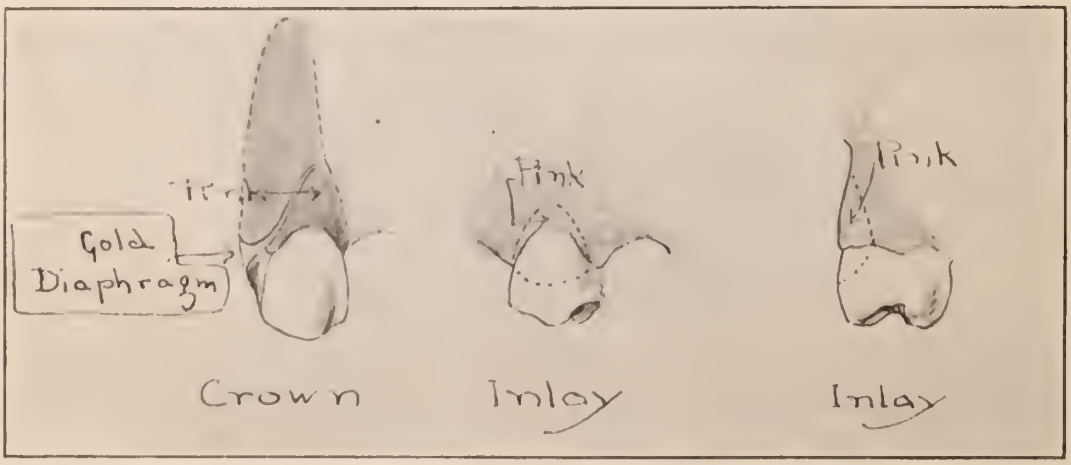


Figure 4

The actual work is not a difficult task. A small amount of the porcelain enamel is mixed on a glass slab with distilled water, and enough mineral stain is added to produce the desired color, and this mixture, after it has been spatulated to a very fine powder, is painted onto the tooth in the places we wish to color. This is true, also, of facings for a bridge or



teeth for a plate. A tooth may be ground previously, but that is not necessary, and, in fact, better results can usually be produced without grinding the tooth at all, unless we wish to change its shape.

The one important part of the work in coloring or decorating a tooth is to put the porcelain on *thin* and *smooth*. Sometimes an irregular spot on an inlay will produce a beautiful result. Of course, such a spot should match some peculiar spot or color in the tooth which is to receive the inlay, or in an adjoining tooth.

In cases where inlays are to be put in the anterior teeth which have badly receded gums an artistic result can be produced by building the upper portion of the inlay to resemble the shape of the normal gum, and then coloring that portion with pink to match the color of the gum.

FIGURE 5

There are some cases familiar to all of us where the teeth for an anterior upper bridge or for the anterior part of an upper plate appear too long to look natural. We sometimes see this condition also in natural teeth, where the gums have receded very much and large labial cavities have been filled with porcelain. A natural effect can be produced, as in Fig. 5, in such cases by baking porcelain on the teeth or inlays so that it will represent the shape of the gum under normal conditions and then coloring this portion pink to match the color of the gum.

It is hoped that this paper will stimulate a more general desire for this class of artistic dental work. Such esthetic work is most pleasing to the patient as well as profitable and gratifying to the dentist.

## DISCUSSION

DR. H. F. CASSEL: Staining artificial teeth, or "decorating" them, as the essayist has put it, has a very important place in the work of any dentist who is trying to do artistic work.

We see frequent need for staining or coloring porcelain teeth, and I cannot see why with the clear presentation of the subject by the essayist and after seeing what can be done by the beautiful specimens passed around we cannot more frequently use it in our daily work. Of course, the great drawback is the color problem, as in all porcelain work. Some of us never will know how to apply colors, because we do not possess the necessary temperament, "color sensitiveness," as artists call it.

While I think the majority of dentists have an esthetic sense they do not devote enough time to this class of work to obtain gratifying results.

However, this may be said of a number of things a dentist is called upon to do occasionally only.

My own experience in the use of stains has been very limited. I have on several occasions baked a small spot or line of blue on the lingual surface of centrals and laterals to get a blue effect on the labial surface, and I almost aways use various shades in making full dentures. This is more easily done and is quicker than coloring them yourself. Turpentine, instead of water, I think, makes a smoother mix when applying the colors.

I wish to assure the essayist that it is very gratifying to me to have the privilege of hearing a paper read which deals with the artistic side of dentistry. Much of the work we see is so entirely devoid of the artistic where it could be combined with the practical just as well as not if the time were only taken to do it.

Dr. E. P. Dameron: If there is any means by which we can diminish or remove that glaring artificiality of porcelain teeth, it should be the duty of us all to practice such a method, for there is no other profession whose work or treatment tends so noticeably to make or mar facial beauty. Not alone with artificial restorations, but by correcting irregularities and deformities of the mouth are we in position to improve one's appearance.

Dr. Haverstick's paper is timely and of good value, for it gives us the technique of a simple method of greatly improving the appearance of artificial teeth, giving them individuality not possible to be had by purchase from the supply house. His exhibits are beautifully done, and it needs but a glance to see the possibilities in this work. I have done a little of this staining, but did not continue it, because I found that the mineral stains in time wore off and, inasmuch as I had selected a tooth of lighter shade for my foundation, I found, with the stain worn off, the tooth was badly off color.

I learn from this paper that by combining porcelain enamel with the mineral stain this difficulty is obviated, and I shall now renew my efforts to individualize porcelain teeth. Two or three essential points in our daily practice we should ever keep in mind—from the patient's standpoint—is, first, freedom from pain—both from the diseased condition and from the operation correcting it—then comes appearance of the restoration, and last, durability of the work. We expect to learn this evening how to operate painlessly. Dr. Haverstick has just shown us how to improve the esthetics and we have volumes upon durability of restorations—all of these things we should keep in mind when we serve—but it is my opinion that appearance in the mind of the patient surmounts all other considerations—perhaps not just at the moment of treatment, but as time passes.

I appreciate Dr. Haverstick's paper and the possibilities it brings again to our attention. Let us not go away and forget this matter, but add it to our armamentarium and it in turn will add to our success and to the gratitude of our patients.

Dr. Haverstick (closing): I appreciate very much the enthusiastic discussion of the paper, and I am glad to know that so many are interested in the subject.

I must differ with Dr. Cassel in that he believes he can select teeth from different sets quicker than he can color one set to suit the case. And, also, that turpentine is not better than distilled water. I wish to urge you again to try this method.

Fewer people would suffer from heat if there were no thermometers.

* * *

A great many people who get sympathy would be better off without it.

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Men are so inclined to content themselves with what is commonest, the spirit and the senses so easily grow dead to the impressions of the beautiful and perfect, that everyone should study by all methods to nourish in his mind the faculty of feeling these things.—*Goethe.*

# THE DENTIST AND HIS OFFICE AS SEEN BY THE LAITY*

BY W. O. THOMPSON, D.D., LL.D.,

PRESIDENT OHIO STATE UNIVERSITY, COLUMBUS, OHIO

I MUST SAY at the opening of this address that I am highly honored by having such an audience as this, composed of professional persons on an evening of such inclement weather, when we could not expect anyone to turn out. It is evidence of a professional spirit that we might fail to find in other circles. It is the best evidence we can have of a professional spirit and that you are willing to come together and have yourselves photographed. It is an encouraging sign and an evidence of our professional spirit that we are willing to come together, willing to listen to the severest critics, willing to listen in a charitable state of mind, and willing to take the criticisms in a kindly spirit, of people who know less than we do. That is the best evidence of the bigness that is manifested everywhere in the professional life of today.

The little man cannot stand criticism. The business that is uncertain is always jealous of its integrity. It is always very much alarmed if an adverse paragraph appears in the newspaper or a slighting remark comes from its neighbors. It is one of the best evidences of the professional spirit of any society when it is willing to listen to any criticisms that may be offered against it, and to meet that criticism in a manly and honorable way. It is only the strong oak that can stand the winds of misfortune and grow thereby.

I should say at this point, that all our professions are showing progress in this direction. They are growing in spirit and giving evidence of bigness. They are giving evidence of a higher conception of professional duties. All our professions are giving evidence of this growth and showing that they are willing to be open and above board in all they do for the purpose of bringing out the foundations on which their science rests, and that, in the presence of each other, they are ready and willing to confess the facts as they are.

There is a new angle of vision tonight, when an outsider should come in to express himself: that the layman should undertake to tell the profession what he thinks of it.

When the Supreme Court of the United States was first criticised, the people were shocked and had fears for our safety. In the growth of our republican institutions there was a certain sacredness which had gathered about our Supreme Court that was traditional. We had learned to respect it and to believe that a profound respect for that court was a sacred thing. We have slightly changed our point of view in this regard. I think it will not be revolutionary. I think we all believe in the permanency of our courts, and the importance of our judiciary in our republican form of government.

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*Stenographic report of an address delivered before the Columbus Dental Society, January, 1913.

The preacher, as well as men in other professions, has to take his criticisms. The layman and the newspaper have freely discussed the whole range of questions affecting the pulpit and the things that concern the church, and the church has had to stand the fire of criticism. The legal profession has been criticised and out of the criticisms has come a higher standard and a greater efficiency in that profession.

The dental profession as well as the medical profession has had to bear its share of criticism. That your profession has been willing to stand this criticism in a kindly spirit is a matter of great encouragement. Of course, I know that much of this criticism is unjust and much of it is false. very often men of evil minds and ill-disposed men say untrue things about our institutions. As professional men we must learn to carry these burdens and bear these criticisms with patience. We must learn to hear patiently the criticisms of men who misrepresent us, and men who misconceive us. That is a part of the burden which you are called upon to bear.

To my mind, no man is fit to enter a profession, certainly not the most important of our professions, who cannot stand criticism, and who is not willing to face it with a wide charity. To my mind no man is fitted for public office who cannot stand criticism, and allow freedom of discussion upon all his public acts. This introduction, if I may call it so, is intended to bring before you my conception of the basis of the professional spirit. I want to apologize in advance for what I may say in regard to the professions.

There are three or four points of view from which we may get our visions of your profession as well as of other professions. We may greet the professional man as a citizen, and make up our mind as to his standing as a representative of the profession in which he is engaged. Again, we may look about his office and see the equipment that he has for the work he has undertaken in the profession. We may take another point of view and look to his ideals, make a search for the professional spirit in him, and thus get a photograph of the man or woman in the office, or we may enter the free clinic if we so desire, see what he can do, and in the doing of which we may discover the spirit of the worker in his profession and thus catch something of the conception of his duty to the rest of the world. We may see in his work how he regards his profession, and whether his growth in his profession is measured by the service he is able to render to the world. If so, well and good: if not so, it is not well and good.

I have a few impressions of the dentist and his office, for I have lived in several communities, and I have been in the dentist's office. I can go back in my recollection to the days when the dental office was merely an adjunct to the family physician's office. What was done there was auxiliary to the work of the family physician. If a tooth was aching it was pulled out, and the dentist's office in those days was synonymous with the tooth-puller. One of the excruciating ills of society then was toothache, and his only care was to get it out, and the ordinary family physician of steady nerve was able to do it, and he did his work to a finish.

When we see the modern dentist do his work, we are inspired with the idea that he is a man whose profession is not an avocation, but a vocation, and that his calling is to look after your efficiency, to look after your comfort, and he spares no labor in ministering to this end. He is interested in your physical efficiency and incidentally he looks after what may be good for that organ of the human body, the mouth, which is the seat of all energy. This man at the very outset will inspire any reasonable observer as a man whose attitude is that of fundamental helpfulness to humanity.

I suppose there is quackery in your profession just the same as there is quackery in the medical profession, or in any other profession. We may assume that there are gradations in skill, in efficiency, and in intelligence that go to make up the man or woman in the dental profession, but there is a professional spirit that gathers about the modern dental office that is very evident to the careful observer. From that point of view, as a citizen, I have a keener appreciation of the dentist than I had when I first came to know his office.

I want to say at this point, gentlemen, that the best publicity you can have is the spoken appreciation of the people who are served by you.

I know that it is frequently reported that the surgeon is always anxious to use the knife, either for the making of a reputation, or money, or both. I know there is a conception that men are willing to sell you goods whether you need them or not, and willing to pull your tooth whether you need it pulled or not, and there are people who go into the dentist's office with an element of uncertainty about the whole situation.

I know that I had to argue with the surgeon who operated on me, and I did not win my case either. I have a better appreciation of the surgeon today than I ever had before. I believe the modern dentist has the professional spirit to look into a man's mouth and tell him what he ought to do to preserve that mouth and to conserve his efficiency. That is the kind of publicity which you need as a profession.

We have lawyers who like law suits, but the lawyer of professional spirit will avoid litigation whenever it is possible. The whole trend of modern medicine as well as dentistry is prevention, care and education, in order to conserve the resources of men.

You will remember that when we thought of physical inspection in the public schools of this city we were threatened with the usual experience of government by injunction. We went ahead, however, and did it and the injunction has not yet been ordered. By-and-by, we shall have oral inspection in the public schools, and the work along this line will be extended. We shall look into the mouths of children and this medical inspection will be in the interest and welfare of their bodies, and will conserve their resources. We have made very great progress in this direction, and we do not look upon the dental and medical profession today as we did formerly. We do not regard the dentist today as a man who is pushing his own cause for the mere matter of gain, but we look upon him as a man who stands for the ideals of the profession, and any of you who think of entering the dental profession should let these ideals drop in on you.

You must use your powers in your profession, so that the world will recognize in you the professional spirit which ought to belong to your profession.

I have found that the enthusiastic men and women in any profession are those who have caught a glimpse of the professional spirit, and that spirit brings to them their vision. Of course, the rewards of life are always to be regarded in the way of remuneration received by the particular person in any profession. Every lawyer wants to stand well among his fellow attorneys. A judge who could not command the respect of the attorneys at his bar would soon be in disrepute, disgusted with himself, and compelled to leave the bench. A person who cannot sustain himself among a jury of his peers is not worthy of respect. It is so in every profession.

The lawyer must sustain himself among his fellow attorneys, the preacher must sustain himself among the preachers, the blacksmith among the blacksmiths.

The man who cannot stand criticism of his profession is not a worthy member of it and has not this professional spirit. The professional spirit is what keeps up our societies. That is why you appreciate and recognize the value of your associations. It brings you certain rewards and gives you a status in the profession and in your community. The professional spirit should show itself in the dental profession from the standpoint of equipment.

I remember very well the effect on my mind in going first into a physician's office. I remember the effect on my mind when I entered for the first time into a beautifully equipped banking room. I remember the effect on my mind when I entered the first time a beautifully equipped home, with a sanitary bath room. I had a certain feeling which I cannot describe and I cannot forget the effect it had on my mind when I first saw it. Just so, you will notice a certain effect on the mind when you enter the modern dental office. You notice the efficiency, the cleanliness, the orderly arrangement of things and a certain amount of intelligence, and you will be surprised at the readiness with which the operator lays hold of the instrument he needs. In other words, there is a certain thoroughness of preparation in evidence as you see him go about his work.

The old country school house was a structure with four bare walls, with blackboards all around the room, but the modern school building is artistic, and has the educational equipment necessary for the education of our children. I remember that some members of our school board were amazed when I suggested that we should have some of the modern equipments in our school buildings, and I suggested that we should visit other cities and discover what they had been doing in this regard. I suggested that we have water in the buildings in the interests of cleanliness and some of our committee who went on this inspection tour were opposed to it, but they came back converted to the idea. We have a committee now who are on a visit to the high school buildings of St. Louis to see what they are doing in the way of modern equipment.

We always have a certain number of men among us who have to be educated by seeing these things for themselves. Now when we equip a new school building it will have all the things which are needed.

So when you enter the dental profession it means that you are to equip yourself with all the things that are needed in your profession. When you study prophylactics it means that somebody has worked out the needs of the community. It means that someone has mastered the subject and equipped himself for these emergencies. This point of view means progress in your profession. I have discovered that nobody in the profession is satisfied with a second-rate equipment. This spirit marks the real progress in surgery, in medicine and in dental surgery.

All the various equipments we have today in these professions are intended to increase human efficiency and conserve human resources. I look upon the dental profession as having this same spirit. That spirit commands the respect of every layman and that kind of an attitude toward the profession ought to find its way into every community. For the purpose of illustration, I may say that the matter of inspection in the public schools was very much opposed in the beginning, but today it is having the support of many who formerly opposed it because they have seen the benefits of it.

We said let us start this inspection in a modest, unassuming way and win our way into the confidence of the community. We did not seek notoriety, but we tried to do something to conserve the resources of the children.

I remember there was a German in the south end of this city who had a boy that was going blind, and the nurses found him and referred him to the proper remedies with success. Since then, that father has been profuse in his thanks and is an enthusiastic supporter of medical inspection. The welcome accorded to us by these people and the kindness with which we have been received in their homes is more than we expected. That kind of work does not usually get into the newspaper. That kind of work is not usually reported, but it is the best evidence of professional service and professional spirit. I think we need more and more today this expert service in the field of dentistry. It is necessary for people to get an appreciation of the service, so that they will use it. I think the laity is beginning to appreciate this service, although there are many still who sneer at it. The community is not fully alive to the value of this service and society needs to be educated to provide for the conservation of its own efficiency.

I think we shall live in a generation not far off when we shall be in a better condition so far as dentists can make it. There is no reason why the proper teaching should not be given to our children, and there is no reason why the professional aid should not be given. There is no reason why a boy should grow up with a deformed mouth, so that he cannot laugh without ruining his reputation. I think the dentist is willing to do his share in this public service. I think he is willing to do it from the standpoint of the professional spirit.

I need not tell you of the outcry against the dentists that they are simply doing it to get their fees. I need not tell of the outcry against the surgeon that he advises an operation for the sake of the fee or his reputation, or both. I do not think it is all the work of a physician to treat somebody who happens to be ill. We need to get into this wider conception of public service, for I think it is in the profession. I think it is this point of view that has given people an appreciation of the services rendered.

Speaking from the point of view of a layman, I should say I have a keener appreciation of the services of the physician and surgeon than I had twenty years ago. My admiration for these professions is greater now than it has ever been before, because I am using a different viewpoint in looking at them.

I need not tell you of the people who do not think properly of your profession and who do not give you the credit you deserve. I might go on preaching to you at great length about these things. I suppose I could tell you about some dentists who have made false steps in their professions; I might tell you about dentists who have pulled the wrong tooth. I suppose I could have gathered stories and told you about the careless, blundering dentists I have known. I suppose I could have come down here and entertained you with humorous sarcasms about the profession to which you belong, but I have chosen to speak from another point of view.

The professional spirit is being greatly developed in your profession, and the young man who thinks that he can be a tooth carpenter simply by blundering along in his work has made a fatal mistake. The professional spirit which is being developed in your profession today will, in the course of time, eliminate such members from the profession.

I know that it is difficult to protect yourself against public sentiment. You must live surrounded by people of lower ideals. I know that you must compete with the man who does his work badly, and you must compete with the shiftless man, who is without any professional spirit. You must recognize these difficulties and believe that these are no reasons why you should go to the lower level, but that by educating the people up to the professional ideals, by developing a professional spirit, and by a line of better things you can elevate your profession.

I might talk to you along this line further, but I am afraid you will think I am Billy Sunday preaching to you. I know the temptations there are in every profession to go into quackery of all sorts. I know there are men who cannot diagnose our troubles. I have laid this down as Article No. 1 in my creed, viz: I will not go for professional service until I am sure of the integrity of the man to whom I go. I will not patronize any man unless I have faith in him as a professional man. If I go to a dentist or a physician or a lawyer it is because I have faith in the integrity of the man to whom I go. I would rather be the person defrauded under this condition than to be the person who defrauds. When a man comes to you for professional services you cannot afford to give him anything but the best that is in you. From a professional point of view, you cannot afford to do otherwise. In other words, you should always do your best work at all times. You must have this professional spirit in order to do your work in the best possible way, so that your work should always be an evidence of the finished workman, the workman of integrity and of character. If we do this, the professional spirit will grow in us as we grow. No person ever grew to great proportions, either morally, intellectually or professionally b ytreachery, or slip-shod methods, or by indifferent regard for results. No man ever succeeded who did not possess a consciousness of his own integrity and character in his every day service. The really big men and women of the world have been developed by their services.

You remember Frances Willard and what a modest woman she was when she began her work, and then you remember her when she was full grown in her work. That woman had come to a full growth in the service which she rendered the world. That is the kind of a service we should render in our profession.

When we recognize this service in any business it becomes a profession, whether it is the growing of crops or the building of houses. When we throw ourselves into our business it brings us up to our full growth. Robert Callier was a man who recognized this ideal, and he did something more than nail shoes on horses. There may be just as much ethics in the sawing of wood as there is in the practice of surgery. Both are degrading if they are done in drudgery and at so much per cord. It is by bringing this splendid spirit of service into our work that makes for the best that is in us. If you would succeed you must bring this professional spirit into your work.

I say to my students, for I deal mostly with students, and talk mostly to students, that it does not make a rap's difference what you do in life. The world is not interested in what you are doing, but the world is interested in knowing who is doing it and how it is being done.

These false divisions between what is menial and what is noble must be swept away and we shall get our vision of a man in lowly life, who commands higher respect because the world sees that he is growing. This is the spirit of our profession and the glory of opportunity. Without this professional spirit you could reduce the dentist to the level of a mere heel-trimmer in a shoe factory. He would have no inspiration, he would have no vision of a service mission, and he would have no reward except his pay envelope.

If you look upon your work from this point of view, your profession and your work becomes mere drudgery, and you are reduced to the lowest kind of labor, with the lowest kind of ideals.

It is because we are trying to get away from these things that we believe in a service of the highest kind, and believe that the best service the world knows is, that he lives most who serves most. The true spirit of your profession is this vision of service to the world, and that he who would be chief among you should be the servant of all.

## THE ROENTGEN RAY IN THE DIAGNOSIS OF DENTAL LESIONS*

BY JAMES W. HUNTER, JR., M.S., M.D., NORFOLK, VA.

I ASSURE you that it is a great pleasure to be with you upon this occasion, though I am deeply cognizant of my own limitations. When your committee waited upon me, requesting a contribution upon the Roentgen-ray examination of the teeth, I consented with some hesitation. I am well aware that, though the practice of dentistry is a special application of my own art (I now speak as a medical man), there are those who would have it as a craft of its own. I felt with Pope that

> "Fools rush in where angels fear to tread."

Yet the interests of the two professions are such that I could not refuse. The greatest boon to the human race is that *summum bonum* of Juvenal, a healthy mind in a healthy body, *mens sana in corpore sano.* In a more restricted sense we are dealing with a good digestion.

> "For good digestion waits on appetite,
> And health on both."

It is to the teeth that we must look. Hence I am before you and shall try to discuss in a few words the subject so eminently chosen by your committee. I refer to the use of the Roentgen-ray in the diagnosis of dental lesions.

Let us then review the formation and arrangement of the teeth. It is only by the ever present knowledge of the normal subject and the difficulties besetting any technique that we shall understand its limitations. In a word, we are confronted with somewhat the same problem as the map-maker. We must interpret our patients by a sort of Mercator projection. For the application of the fluoroscope to the teeth, as in every other part of the body, is most unsatisfactory. Hence, the employment of plates or films. As the contour of the jaw is forward and inward and the teeth

*Read before the Virginia State Dental Society, 1912.

themselves deeply set into alveoli extending up to the palatal process in the superior maxillae, while the inter-ramal space of the mandible is completely filled with other tissues, the difficulty of exact reproduction can be appreciated. Moreover, we are not dealing with photographs made from objects shining by reflected rays, but with shadow, or skiagraphs, made by the projection of transmitted light.

We shall now take up the technique of the exposure, and first consider that method dealing solely in the employment of plates, in other words, the extra-oral method. By reference to the picture on the screen, you will see that the side to be studied is placed directly against the plate, while the jaws are widely separated by a cork or wooden peg. Now, in order that the teeth of the one ramus or superior maxilla may not interfere with the other, some kind of angulation is necessary. In the picture submitted you will see that the head is bent at an angle to the trunk, while the target of the tube may or may not be at an angle with the plane of the table, upon which the patient reclines. The more extreme the angle between the target of the tube and the plane of the plate, of course, the more distortion, but at the same time the clearer the detail. This method is exceedingly fine in dealing with the molars and bicuspids, but to me most unsatisfactory where the incisors and canines are involved.

The extra-oral method is theoretically applicable to the examination of the incisors by placing the patient with his nose directly upon the plate, the light being passed through the skull. Unfortunately, however, the heavy bones of the cranium have so obstructed the ray that the shadows of the teeth are almost uniformly poor. This method, nevertheless, is most valuable in the diagnosis of lesions to the various sinuses of the skull, more particularly to the frontal and maxillary sinuses. In the picture now presented we have an excellent radiograph of the normal skull. The original of this was not the Honorable Theodore Roosevelt, but a negro man employed in the U. S. navy yard at Norfolk, who was hit in the temple by a pneumatic riveter; yet no damage was done. Had the patient belonged to our own race, I fear to tell the consequences.

In those cases of fractured mandible or those for some reason subluxated, the extra-oral method must be employed. It is again my pleasure to exhibit a normal skull from the side. Here can well be seen the articulation of the mandible with the zygoma, also a normal antrum. I had hoped to show you at this time a most remarkable case, referred to me by Dr. Randall Barrett, of Norfolk, showing a molar tooth driven up into the antrum. This plate, however, has, through careful filing, been misplaced.

What is probably the most satisfactory examination of the teeth by the Roentgen-ray is known as the intra-oral method. In this case the sensitive emulsion is placed within the mouth. But owing to the concavity of the mouth from side to side, the dome of the upper jaw and the tongue in the lower, some sort of inflexible surface must be used. For this purpose the celluloid film surrounded by some kind of waterproof and lightproof material is the best. But, as it is impossible to place the film against the whole of the teeth to be radiographed, we must again resort to a method of angulation. This is, I think, satisfactorily shown in the picture. By applying the same method and turning the portion of the jaw, any part is easily examined. But again I must call your attention to the fact that, owing to the conditions involved, namely, the necessary angulation and the curvature of the jaws, the film as developed, like the maps of our own planet, show some distortion.

With this discussion of the technique, let us turn to the practical of the Roentgen-ray. To what cases is it applicable? We shall consider the subject. First, in regard to the size and position of the teeth: we may deal with an impaction, an unerupted tooth, a supernumerary one, or a fragment, likewise the presence or absence of a tooth; secondly, with the pathological condition, as an abscess, a necrosis of the root or pulp, a foreign body in the neural canal and all sorts of other troubles, as exostoses or malignancy.

In my own experience I have found most of the trifacial neuralgias distinctly traceable to the teeth. A case referred to me some years ago by Dr. B. A. Lester of a lady of 26 suffering exquisitely, showed an unerupted third molar just under the posterior root of the second molar. A diagnosis of impaction was accordingly made. Dr. Lester extracted the second molar with complete relief. In a recent case referred to me by Dr. Arthur Langford (and here reproduced), in a lady of 23, who had been operated upon for a supposed antrum trouble, I also found an impacted third molar. The relief of the impaction will relieve the patient.

Yet, perhaps, it is to the orthodontist that the new method of diagnosis will be most valuable. Much depends upon the absence or presence of an unerupted tooth. Time and again have I heard mothers blame an innocent man for the extraction of a milk-tooth from a daughter's mouth: "The doctor said that there was another tooth to be cut, but none ever came." The case now shown was one referred to me by Dr. W. H. Pearson. As you can well see, the tooth is imbedded. Upon the other hand, I shall show you a case of a supernumerary tooth. This was in a lad about 13, referred to me by Dr. H. W. Campbell, of Suffolk.

Again, one of the most distressing conditions, giving rise to much pain and suffering, is a part of an old root long since necrosed, acting as a foreign body. A case in an elderly lady (referred to me by Dr. Pearson) shows an old fragment well secluded in the gum. Nor is this all. There is often some medico-legal point involved. A recent case in a young lady was referred to me by Dr. Harold Webster. The patient was in a railroad wreck and complained of some pain; the jaw was slightly swollen; yet the radiograph shows the teeth in excellent condition.

I might multiply examples of trouble caused by unerupted and impacted teeth. Suffice it to say that at the last meeting of the American

Roentgen-ray Society many cases were shown of such a condition precipitating attacks of epilepsy. It is well to bear these cases in mind, for, while no one considers epilepsy a disease in any way due to irregularities of the teeth, it is a fact that in the cases reported the removal of the impacted teeth relieved the symptoms and in one case allowed the patient to return home.

To the student of the embryology of the teeth, or of the periods of their eruption, I know of no more beautiful or useful way of employing one's time. I show you now a plate made for Dr. Harold Webster. This was in a backward child. The parents were pleased as a result of the examination. And, as prophylaxis is in my own profession the key-word to modern medicine, so it seems to me that with you, gentlemen, every case of delayed or irregular dentition should be examined. What our eyes cannot see or our probes feel may be revealed by the Roentgen-ray.

To that great class of pathological processes in the teeth or their sockets, namely, abscesses, necrosis, pyorrhea, etc., the Roentgen-ray will be most useful. Normal and abnormal bone does not give the same shadow. The skilled roentgenologist can aid you much: the processes are exactly the same as in other bony tissues. Unfortunately, I have no slides to show you. But, fortunately, I am to be followed by Dr. Corielle, and to him I shall leave this pleasant duty.

Before I close, I should like to sound a note of warning. Too prolonged exposures may be followed by disastrous results. The work must be done as quickly as possible. The dangers of prolonged irradiation are loss of hair (fortunately only temporary) and a dermatitis. Hence, the employment of a large machine and a heavy tube. In my own experience, using a large coil with a current varying from 85 to 90 ampères in the primary, I am now able to skiagraph a tooth in a fraction of a second. For plates I use a somewhat longer exposure, somewhere from three to six seconds. Nor is the rapidity of exposure the only advantage. The unconscious movement of the patient is also eliminated.

To conclude: The Roentgen-ray in the diagnosis of dental lesions is most important. It gives one the "ocular proof." A diagnosis from subjective symptoms or from the use of needles and probes is most unreliable. Preventive dentistry, like preventive medicine, is the order of the future, and it is the best diagnostician, whose labors shall be crowned with the greatest success.

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## A METHOD OF TREATING TEETH BEFORE CROWNING

BY H. E. BRUBAKER, D.D.S., MCCOMB, OHIO

Before setting crowns, apply dam, dry teeth with warm air, then paint teeth with a thin coat of Gilbert's Aluminum Lining. Hasten drying with chip blower.

This method lessens pain in setting crowns, also acts as a medium for the protection of the pulp.

# IS THE DENTAL PROFESSION PREPARED TO KEEP PACE WITH THE PROMISING DEVELOPMENT OF THE ORAL HYGIENE PROPAGANDA?*

BY T. O. HEATWOLE, M.D., D.D.S., BALTIMORE, MD.

THE WRITER of this paper does not wish to be classed as a pessimist on the subject of oral hygiene, but having had some practical experience in assisting such a movement in one of the larger cities of the country, which provided an opportunity to study at close range the feasibility and expediency of the methods advocated in working out fundamental details and principles of the various questions involved, he feels inclined to the belief that the interesting and fascinating features connected with the promulgation of the subject have caused the promoters to far outstrip in their teachings the possible practical application of their policies to conditions as we find them.

Real and substantial progress along any line, and more particularly along scientific lines, must be based on absolute fact. Theories and speculations are of little avail, except insofar as they may be utilized in reaching out in search for truth, correct conclusions being reached through a process of proving or disproving the same. And in addition to the scientific features of our propaganda, there are many co-related factors entering into the matter of successfully meeting the issues of the proposition; so that it may not be out of place to pause for a time for the purpose of taking an inventory of the means and materials at hand with which we are to do service in a cause that possibly affords the greatest opportunity yet presented to the dental profession.

The subject of oral hygiene is admittedly a big and vital question, full of meaning to the profession and to the general public. While important to us, its very character and the means through which it is to be finally and successfully worked out and put into practical operation, makes of it a public question rather than a mere professional one. Coming, as it does, directly under our domain, and being an output of the dental profession, the responsibility is on our shoulders to blaze the way and provide a safe and sane policy, reasonable and possible of accomplishment, which shall lead to a gradual, permanent and healthy development. To preach and not be able to put into practice will only serve to stamp us as lacking in a knowledge of the affairs of life. To attain and maintain the place of prominence which this movement naturally provides for us must mean that the members of our calling need to be awakened to the importance of the new era: to emerge from former office and home obscurity to give material interest and help to all classes of humanity, to touch and taste the varying and vitalizing forces and phases of social, political and economic life, in order to have them know and be made to feel that our project has a humanitarian side and is not being put forward and supported solely on selfish grounds.

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*Read before the West Virginia State Dental Society, 1912.

Our lecturers and writers on the subject, backed up in their premises by the highest authorities in medicine, are proclaiming the possibilities of mouth hygiene as an up-to-date prophylactic means of combatting many of the systemic diseases to which the human flesh is heir, and also pointing out the promising results in the way of conservation of life and efficiency through the acceptance and adoption of the policies recommended by them.

When we recall the rather astounding facts, brought to light within recent years through the publicity given to important information collected and tabulated, showing the crippled condition, dentally, of school children wherever such examinations have been made, it is only natural that we should yearn to respond to the Macedonian call, "Come over and help us," knowing full well the good to be accomplished in such a field.

Since much emphasis has been placed on the public schools as the most enticing and fertile field in which to show immediate results, let us review briefly conditions as we may expect to find them. For the sake of being practical in our analysis, we may take an assumed city of 500,000 inhabitants. A municipality of this size would possibly contain 80,000 school children. Based on established records, 90 per cent., or 72,000, of these children will need dental services. Assuming that the estimate made, appearing in the June, 1912, issue of the *Dental Cosmos,* by Dr. James Truman, of Philadelphia, and corroborated by Dr. J. Morgan Howe, of New York City, that one dentist cannot wait on more than four hundred patients yearly, then the number of dentists required to serve the 72,000 school children would be 180. It is fair and reasonable to presume that the greater proportion of these pupils might be able to have their work done privately. Reckoning on 75 per cent. of them utilizing such means, it would require the entire time of 125 dentists to meet the demand. The remaining 25 per cent., dependent upon the municipality or on charity, would demand the full time of 45 paid dentists, and at a salary of $1,800 each per year, would require the raising of $81,000 yearly for this one item alone, not taking into account the first cost of equipment, the maintenance and supplies, which would be considerable, probably running the amount up to $100,000. Carrying our analysis still further, we may deduce the following: It will require $100,000 to care for the indigent poor of the public schools alone in a community of 500,000 people; then, assuming that the conditions are the same all over the country, in which there are, according to the last census, nearly 100,000,000 inhabitants, the sum necessary to successfully carry on the work nationally would amount to the staggering figures of $20,000,000 annually.

We are not presuming to say that it would be unwise to expend even so vast a sum in a cause fraught with so much good to the nation; but since the propaganda is mainly dependent upon favorable legislation for its ultimate triumph, this phase of the question will have to be met prior to such action by the legislators, either national, state or municipal. Are we, as a profession, prepared to meet the test? To ask for legislation is a simple and easy matter; to urge it forcefully is quite another thing; to secure it is a supreme and oft-times difficult accomplishment. All of these stages we shall probably be called upon to pass through and master if hoped-for results are to be obtained. And who can venture a prediction as to the time when public officials shall become convinced of the practicability of our recommendations? It may be years, it may be decades, and it may even be quarters of a century before a satisfactory basis can be reached. And, in the meantime, upon whose shoulders is to rest the burden and responsibility of keeping alive, developing and maintaining the proposition? Unquestionably it will fall to the lot of the dental profession to assume this burden and responsibility. Are we prepared to hold out until success shall eventually crown our efforts?

There appears to be a well-defined impression prevalent in some quarters that the dental profession is already overcrowded, but the absolute erroneousness of this idea may be shown through a study of real conditions. To be prepared to keep pace with the oral hygiene propaganda, as outlined in the foregoing estimate, at least nine thousand additional men to our ranks would be required. Certainly it would be most injurious to press a question to an issue prior to being thoroughly equipped to handle the situation. Besides, through the educational and civilizing influences of our teachings, many adults will be made to realize the importance of mouth cleanliness, and this, of itself, has already created a demand for men of our specialty not at the present fully met by the number of recruits entering our ranks each year.

In summing up this subject, let me appeal to this gathering of organized professional men to study well all the issues involved in the question; to play well your individual parts in the scheme; to insist, if need there be for it, on a plausible and logical evolution of the plans; to stand steadfastly for the right and truth, with an eye single to substantial professional lines; which will mean the gradual and successful surmounting of all obstacles and at the same time spare us the embarrassment of a setback, save us from the humiliation of defeat due to a lack of preparedness in dealing with a big problem, and will bring us finally through a happy issue to the goal of our dreams.

## DISCUSSION.

**Dr. J. A. Libbey**, Pittsburg, Pa.: I am a little nonplussed in starting out to discuss this paper, because it was so different from what I was expecting. I thought I would have an opportunity to start out and tear the paper all to pieces; but the ideas of our friend from Maryland agree so thoroughly with mine that it makes it difficult to start the discussion.

As he says, this is a great subject, this matter of oral hygiene. We, as practitioners, have been working along this line as educators, talking to our clients, talking to the children, talking to their parents, and urging them along the line of oral hygiene, some of us (like Dr. Arthur and I), for a good many years; and yet to sum up what we have accomplished, it is the minimum. It is indeed a great subject. We now have a magazine that is devoted to that work. It is published by one of our supply houses, and they have an editor who is a man of great force and, in the main, is doing a good deal of work, helping in the education on this subject.

The essayist speaks on the subject of inspection of the schools. There is a matter, just as he suggests, that we should go slow on. In the first place, in a good many of our States, as in ours, there is now a medical inspection in the schools, which is right, and they are doing a grand work. We want to help in that work. In one of our neighboring States not long ago the medical men had before the Legislature a bill on this subject. A committee from our profession went before the Legislature and made some demands in that bill that if they had been listened to would have defeated the bill. They were honest and conscientious in their work in that direction; but, just as the essayist says, we are liable to do harm by going too fast. What is the result of that? Some of these members were at the National Association in Cleveland; saw a great display there along the lines of oral hygiene, a grand work that has been done there, but all of that grand work that was done there was directed to one object. The children were separated. A class of backward children was taken, separated from the rest of the school and given a teacher of more than ordinary ability. The committee did their work well, so far as oral hygiene was concerned. The teacher did her work, and, putting it all together, their improvement was wonderful.

I heard Dr. Woodbury say a short time ago, the result of that was, instead of advancing our work along the line of oral hygiene, he was satisfied that it was put back two or three years. Today in Cleveland, where all that work was done, he claims there is not a single one that is working now in connection with the inspection in the schools. That work has dropped dead. Why? Because of over-enthusiasm. Legislation? How must we start? Are we a separate profession? Are we going to claim that we are a profession separate entirely from the medical profession, the great healing art, or are we a part of it? The American Medical Association acknowledged us a part of it a few years ago. If we are a part, why not work with them, and not individually? And the real way we will have to work to accomplish anything along the line of inspection in schools is to work with the medical profession in this line. The medical profession needs education along this line. Some of them have become educated and others have not. We must go slowly. We must show them what we can do. We must show them we are not necessarily foreign from them. Until we do that, make our work a part with the medical profession, and they see the necessity of the dental examination, until then we will never accomplish much in that line.

In our State the question was taken up. The dentists offered to give their services free. The medical inspector was given a certain salary for a month for his work, and I was invited to join in and give my services. This I declined to do. We can go into that thing only in one way, and that is on the same basis as the medical profession, if they are remunerated for their services; until we can go in with some dignity upon the same standing as the medical profession, we will stay out and try to educate them from the outside. I do not believe in making the great State of Pennsylvania or West Virginia, or any other State, a charitable institution. They are just as well able to pay the dentist as the physician, as his services are just as valuable, and a little more so than the medical profession; and we must go in on the same basis, even if we go slowly to do it. The medical profession are, as a rule, a great many of them, realizing that fact, though not all of them. When our profession was first organized we wanted in the first place to go in, but the medical profession did not want it. That matter was talked over one time in England—Cambridge, England. Dr. Kirk was over there at the time. One of the men got up and spoke, criticizing our separate schools in this country for dentistry. There a student had instruction from a capable man, and then went into a medical school and took a course there along their line, and he said the great society of medicine would carry the dentists along with them. And after talking along that line for some time, Dr. Kirk was called on, and he said there was something of a difference between that country and this country, so far as that was concerned. The great profession of medicine refused to take us and we started up a little profession of our own.

We had to work along that line until we are being more and more recognized by the medical profession. It was slow work; took nearly 60 years; look what we have accomplished. It is going to take just as slow work and careful work to make this matter of oral hygiene thoroughly of advantage and help to the public in general.

Years ago White's put out a little book on the Mouth and Teeth, and I considered it a very fine thing 30 years ago. I got a lot of them and distributed them among my clients, and said, "I want you to read this carefully." I gave it particularly to mothers where there were any children, marked in reference to the six-year molar, so that they would get to understand and recognize it when they saw it. And I watched carefully, and I would ask, "Did you read the book I gave you?" "No," they would answer; "I put it away carefully, but I didn't have time to read it." I scarcely found one person whom I gave it to who read it. What we have to do is, every single dentist among us must be more urgent in trying to impress upon persons the necessity of thoroughly cleansing their teeth and mouth, and the necessity of having their teeth looked after, and show some of the bad results of not doing so.

I had one bad case I want to cite to show the results, and perhaps some who are not of the profession may take this home and profit by it. A patient came to me about a year ago with such a condition of the mouth that I just stopped and gave him a lecture. "For years I have been preaching and talking and trying to get you to keep your mouth in some kind of condition"—he was a very prominent attorney in our city; a man of intelligence, who had a state and national reputation. "Every time you come in here I have to go over this again. I will furnish the brush and everything, if, just before you come here, you will give your mouth and teeth a good scrubbing. But if you keep on neglecting to do this you are going to have trouble." "Yes, doctor," he said, "I know I neglect it. Each time I go away from here determined I will remember to brush them, and then I forget it." I said, "You have one tooth I must extract; if I don't you are going to have worse trouble." He put it off, and about three months after that he was in the hospital; had an injury to the maxillary gland. They thought it was cancer, but it was nothing more than the fearful condition of his mouth; poisonous condition. They gave him an anaesthetic, performed the operation, and in three days he was a corpse. If that isn't evidence of the necessity of trying to impress upon our patients the need of thorough care along the line of oral hygiene, I don't know of any better example that can be given.

We should study well these points, as the essayist says. We should not let an opportunity go by. Whatever we do, let us do it in connection with the older and larger branch of our profession, and not let every move we make be antagonistic to it, but let every move we make be together, and then we will accomplish it.

Dr. L. G. Beerbower, Terra Alta: The subject is one of vast importance to each and every one of us, and one that I should think would be of importance and interest to our visitors this evening. Mr. Heatwole's paper was certainly splendid. The thoughts brought out were fine, but I think some points that he had there are somewhat far fetched. One especially on which I would take issue with him is the fact that he speaks rather disparagingly about the work for the indigent poor not being feasible, from the simple fact that we will never be able to collect an amount of money to do that part of the work. We all realize that it isn't possible for us to take care of the teeth of all of these poor children that come to our schools; we know that is not possible. We cannot have all of those teeth treated and those abscesses cured on the little temporary molars in order that they may be retained until the proper time for their eruption, and fill all of the permanent teeth already erupted at that age; but we can teach these children how to begin caring for those teeth. If we do not get to do any filling for them or treatments, we can teach them the use of the tooth brush. We all have little patients coming into our office at four or five years of age with possibly nothing but a bunch of roots from one side of the mouth to the other. That means negligence on the part of some parent, because the parent did not know. If we can educate the child to the use of the tooth brush, that child will go home and teach the parents; it is wonderful what a child can teach its parents. We learn from them each day.

Again, we notice the child coming into the office who has a beautiful set of pearly teeth. It means from early infancy, when those teeth first began peeping from the gums, that mother, with a napkin and some antiseptic, had begun cleaning the little mouth; the little child grew up and knows nothing else but to clean and care for its teeth; and that child will become a parent, and down through the ages prophylaxis will be taught and practiced; and after a while we are not going to have so many indigent poor with bad teeth.

We cannot take care of all the teeth, but we can teach the children to prevent decay. Prevention means, after all, salvation in every line, from an educational standpoint, from the moral standpoint, and everywhere else. Don't let them go astray and then bring them back after violation of laws, in dentistry any more than in anything else.

Coming up to the subject from a different standpoint in teaching the parents, let me relate you a little instance. They were trying to raise the debt from the Y. M. C. A. in Charleston. One member had subscribed $100 and said to the committee, ''You cannot do it; you can't raise that debt.'' But the Secretary said, ''We can do it and we will do it.'' This wealthy man went home one night and he found his little boy writing postal cards. ''I want 14 cents,'' he said. ''What for?'' his father asked. ''Well, I'll tell you. I was given 14 names, and I was asked to write each one a postal card and ask for a contribution to lift the debt from our Y. M. C. A.'' He gave him the 14 cents. That night there was a banquet held by the people who were endeavoring to pay the debt. That man got up and said, ''This movement is closer to my boy than I have ever realized before, and instead of giving the $100 I subscribed, I want to make it $600, and before I get through I may make it $1,000.'' This child with others lifted the debt.

The child we get close to in the school and teach the necessity of cleaning the teeth will carry the teaching home, and consequently they will not be on our hands as charity patients, even if we cannot cure all their little ailments.

With reference to the subject of oral hygiene, what he said did not suit me exactly. I do not believe that an advanced case of pyorrhea can be cured, but we can benefit the patient greatly, and possibly help them retain the loosened teeth for many years.

I do not like Dr. Libbey's criticism of ''Oral Hygiene.'' I have endeavored to give a copy of the laity number to every teacher in our town. A great number of children came to me, saying that they were now using their first tooth brush. ''Teacher says we have to have it.'' They would go home from school and say, ''I want a tooth brush and some paste.'' That child, and probably the father and mother, began prophylaxis. They did not all do it; the teachers did not all respond, but some of them did. Suppose that one out of every hundred did. What does it mean? It means that that one will get another, and another, and after a while a chain will be established and we will be doing some good.

Are we overdoing the thing or not? You never get anything done unless you get up some enthusiasm. While we go at a fast pace and then drop back, that is no indication that the idea is being carried too far, because we cannot all be at white heat all the time or we should burn up our material. A human being can do a certain amount of work, and no more. The Superintendent of the Anti-Saloon League of West Virginia once said to me: "I go to the Legislature every time it meets. I get all I can, in way of legislation. Then I go back next time and fight again." That is what we have got to do if we accomplish anything.

Dr. W. E. H. Caldwell, Wheeling: I enjoyed Dr. Heatwole's paper on this subject, but I do not feel that I am able to give a discussion of it. I had hoped that I would have access to a copy of it, so that I could read it over and get a line on his ideas.

I believe from a dental standpoint that, as dentists, we are in a position to handle this question; from a true dental standpoint. I believe in a great many sections of the country we are handling it in the right way, mostly by letting it alone publicly, but endeavoring as occasion arises to instruct our patients as they come to us as to the necessity for mouth cleanliness. I am satisfied that in the section of the State I come from it is the universal practice, upon the first presentation of a patient, to give, first thing, a thorough cleaning and polishing, and a lecture on the side as to the absolute necessity of such care.

Now, with regard to the action of the dentists as a society, I heartily agree with Dr. Libbey that we should act in conjunction with the medical profession, of which we have been acknowledged a branch by the medical association; and I believe we will gain greater headway and do a greater work by aiding them in legislation that is best, and more legislation to apply along the lines of medical inspection of the school children.

I do not believe that the present law in this State, which was passed at the last Legislature, is broad enough. It simply covers the inspection in independent school districts without remuneration. I do not believe that is right. The majority of the independent school districts take it upon themselves to pay a fee. It necessarily had to be a small fee. I understand there are certain funds they can use at their own discretion. In Wheeling the question was referred to our School Board; referred to a committee; put in a pigeonhole; and now we are going to have another meeting of our Legislature, they will take it out of the pigeonhole and talk about it again.

I am in favor of the West Virginia State Dental Society taking this question up in conjunction with the medical profession, and trying to perfect a good medical inspection law in this State. In that way we will educate the public. The physician comes in contact with his patients under different circumstances than we do, and his field for spreading the good news of the necessity of mouth cleanliness is a little broader than ours, because he can go into the homes; we have to have them come to us. They are always in a pretty bad way when they come to us. Aid the physician by educating them, and have the physicians aid the dentists along that line, and we will arrive at the proper result.

This question is as broad as the ocean, and we can talk all night on it; but I have no intention of doing that. As I said before, I am sorry I did not have a copy of your paper. But I believe that is the sensible way, to act in conjunction with the medical society. We had to row our boat for 100 years, but we have now been recognized by the medical profession. I believe the time is coming, but has not come yet, but is on its way; when we will arrive at a more close relationship, more close than it is now, with the medical profession; and by trying to educate the public along these lines, in the course of 10 or 20 years, or something of that sort, we will get what we want, but not any sooner than that. The biggest mistake that has been made is along the line of too much enthusiasm; like a Roman candle, beautiful while it lasts, but when it goes out everything is dark.

**Dr. O. W. Burdats**, Wheeling: I believe the subject has been very thoroughly covered. I feel that it is a subject that we are rather reticent about getting up and expressing ourselves upon. I have hardly come to any definite conclusion personally in regard to oral hygiene. I don't know whether patients have learned to feel that they are enough interested in oral hygiene to take up the matter of reading the pamphlets that are given them. They are accepting their education from us; expect us to bring them up to a point and take care of them; they come to us, and they feel that we will do the very best, having every confidence in us as their professional advisers on this subject.

Not long ago I had a lady of some influence and wealth come to me, who has always taken a great interest in the care of poor children, and she asked me, "When are we going to take up this matter of inspection of school children?" I was rather surprised to hear that she was at all interested, as I had never broached the subject to her; she was a new patient of mine. I stated that we had such a thing under consideration and were feeling our way slowly. I believe it was about that time we had drafted a letter to the School Board and we received a rather unsatisfactory answer, and we dropped the matter for the time being. We felt they were not thoroughly enough interested; had not been worked up to it; and they rather looked upon it as an advertisement from our point of view. The minute that our patients take an interest in it, whether we accomplish anything or not toward oral hygiene, we are awakening an interest in the cleanliness of the mouth. People of education know what that means; poor people do not; but I believe it is one of the arguments in its favor, which the doctor has thoroughly covered; and I certainly feel we should appreciate his coming way from Baltimore to this section of the country to try to enlighten us more. I imagine it is a subject you have taken great pride in, and we certainly appreciate it.

**Dr. T. O. Heatwole**, Baltimore, Md. (Closing): Let me say, in summing up the discussion on this paper, that I am truly grateful for the generous spirit in which the same has been received. Some weeks ago, I had the honor and privilege of reading a paper before the North Carolina Association on the subject of inter-professionalism, and I am pleased to hear you touching on the same subject and along the same lines of my thought on this subject. A fair and frank consideration of the importance of the ethical relationship that should exist between physician and dentist is at this period most timely. Other speakers have already indicated a noticeable tendency on the part of the medical profession of today to warm up to the dental profession. This is a healthy sign and augurs rapid advancement in our work, if met and cultivated in a proper spirit. One particularly encouraging event in the life of our profession is the recent establishment of a stomatological section by the American Medical Association. Such action on the part of our medical brethren is a direct acknowledgment and recognition of our specialty, something greatly desired and looked for for many years. The establishment of this section, while most gratifying to us, nevertheless carries with it great responsibilities. It should and will devolve upon us to develop, maintain and utilize this department as the open gateway to higher professional standing.

A striking feature in connection with above conditions is the fact that the progressive medical men of the day are the better prepared to meet us on a common ground. This is doubtless due to the fact that, through research work and close clinical observation, they have become convinced of the necessity for good oral hygienic conditions if their patients are to be free from many of the ills to which they may otherwise be subjected. In other words, preventive medicine is now the proper thing, and perhaps no other specialty of medicine offers greater possibilities in this regard than does the future of stomatology.

One of the speakers, in discussing my paper, suggests that it is our duty to educate the physician. His point is a good one, and may be applied to all classes and conditions of mankind. We ought to teach the things on which we claim to be specially informed, and this is all the more true when it means the alleviation of suffering. It may be an open question whether or not the dental man is wholly blameless on the point of the cause for the unsatisfactory relationship heretofore existing between himself and the physician. If we are to educate him, it may require some pains to get ourselves in the proper attitude. Advocate your policies with freedom and positiveness! avoid, if possible, open antagonism; approach all questions with an open mind. If you have a theory, do not hesitate to state it. Should he present a better one, do not hesitate to accept it. One trouble militating against a thorough and harmonious understanding and action between dentist and physician in the past was the aloofness that existed between them, for one reason or another. Fortunately, for all parties concerned, that time is now past, and the progressive medical man is prepared to regard the specialist in dentistry as a needful adjunct in a unified healing art. Realizing our importance, he is already using us, as he does other specialists, and it will be most fitting for us, as a young and growing profession, to measure up to the opportunities thus afforded to get close to our medical brethren. A close relationship in jointly dealing with obscure cases will provide a means of education, and under present conditions, the task of educating the physician may not prove such a difficult problem.

Some reference has been made to school boards and their disinclination to give assistance in the matter of putting oral hygiene into effect in the public schools. For eight years, members of the Maryland State Dental Association importuned the School Board of Baltimore City to be allowed to go into the schools for the purpose of demonstrating the actual oral conditions of the pupils. During this period that privilege was denied them, on the ground that such a plan smacked of paternalism, and could not be thought of, although medical inspection was in vogue. It so happened, however, that there came a change in the School Board and the new set of men who came into control were anxious to be up-to-date. Our petition was again presented and permission was granted to make inspection in two of the schools. It required three months to inspect and chart the mouths of eleven hundred children, one man working for two hours each school day. The actual conditions found to exist were about those recorded in other cities. All were advised to consult the family dentist, but many were not fortunate enough to be able to respond to the suggestion. How are these unfortunates to get the advantage of the doctrine we teach? One speaker suggests the plan of training teachers on the importance of oral hygiene. Experience in that work has already shown that teachers of the public schools respond to such training very readily, but when it comes to dealing with actual conditions, they find themselves totally helpless. The indigent poor will get little satisfaction out of being told that relief from pain and health impairment is possible, but at the same time realize that such help is beyond their reach.

We have gone far enough in the matter of inspection of the mouths of the children in the public schools to learn that there is a large number of pupils, who, if they are to get immediate relief, must be served gratuitously, and the point I have aimed to make in my paper is that the profession is not prepared to fully meet the situation at present.

In conclusion, I desire to state to this society that, through an official communication received some days ago, I was requested to invite and bring with me to this meeting, Dr. B. Holly Smith, of Baltimore. He regrets his inability to be with you, and asks that I convey his good wishes and kindest repects to the membership of this society. Many of you know and love him, I am sure, and I take this occasion to deliver Dr. Smith's message of good will and fellowship to you.

# A STUDY OF SALIVA AND ITS ACTION ON TOOTH ENAMEL IN REFERENCE TO ITS HARDENING AND SOFTENING.*

BY JOSEPH HEAD, M.D., D.D.S., PHILADELPHIA, PA.

ENAMEL softening has been considered to be necessarily associated with roughening of the surface, loss of luster and dissolution of the cemental substance that binds the enamel rods together; and whenever enamel decalcification is associated with decay of dentin this conception of enamel softening is only too accurate. But this conception seems to be only a part of the story, so to speak--the final part rather than the complete process of enamel degeneration.

For instance, 1 to 1,000 lactic acid and water at mouth temperature will cut tooth enamel in thirty minutes with a rough, white surface. A tooth placed in 1 to 500 lactic acid and some salivas will be unharmed. A tooth placed in this solution made with other salivas, after three or four days, may show the enamel perfectly smooth and to all appearances normal, and yet it can readily be pared to a slight distance with a lancet. A 1 to 500 saliva and lactic acid solution has an extremely acid taste and instantly turns litmus brilliantly red. A 1 to 20,000 lactic acid and water solution will, at the end of three or four days, leave the tooth enamel unharmed to all appearances, and yet the outer surface of the enamel will, with the edge of the lancet, be found to have distinctly softened. A 1 to 500 lactic acid solution with my saliva, although the solution has a decidedly acid taste, will produce this identical effect. The appearance of the enamel is unchanged but distinctly softened to the cut of a lancet, although before the tooth has been immersed the lancet is unable to make any impression on it.

The action of water solutions of acid calcium phosphate and acid sodium phosphate on the teeth has been mentioned by Kirk, stress being laid on the fact that these salts cause smooth white decalcification. As a matter of fact, many acids in water solutions cause smooth primary softening, if the solution is sufficiently weak. Saliva ordinarily restrains the action of most acids up to a certain point, and then begins with the smooth decalcification and ends with the same rough white decalcification that we find in a water solution. The saliva solution is ordinarily from ten to twenty times weaker in its action on enamel than is a water solution of the same acid strength. The acid sodium phosphate and acid calcium phosphate are, however, intensely interesting in their action, not only in water solutions but in saliva solutions. Acid calcium phosphate 1 to 5,000 water solution, and acid sodium phosphate 1 to 20,000 water solution at the end of two days, will turn tooth enamel into a cloudy, pearly white, with a clear, smooth surface. This surface is distinctly softened to the cut of a lancet. If, however, these teeth are removed from the solutions before the process advances too far, the cloudy appearance will in time disappear, and the tooth enamel will resume its normal appearance. This phenomenon occurred many times, but once when I retested the hardness of these teeth with a lancet I found that not only had the white color disappeared but the superficial softening of the enamel had disappeared also. At first I attributed this disappearance of the softening of the enamel to previous faulty observations, but the same phenomenon occurred in my lactic acid test. A tooth that had been placed in a 1 to 20,000 lactic acid watery solution, at the end of a few days was slightly softened to the cut of the lancet, but a month or so later the lancet would not cut it. It was then that the possibility was made apparent that partially softened smooth enamel could reharden itself if the decalcification had not progressed too far.

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* Read in the Section on Stomatology (A.M.A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession, by special arrangement with the *Jour. Amer. Med. Assn.*

I then made the following test: Two sound teeth with enamel impervious to the lancet were each placed in a lobe of a navel orange. These lobes were each placed in a bottle with a few drops of ether to prevent fermentation, and kept at body temperature for two days. At the end of that time the teeth were removed and examined. The lobe around one of the teeth had fermented, the lobe around the other had not. The tooth in the fermented lobe showed a smooth, white, translucent area of decalcification, running from the cutting edge to about one-third of the distance to the neck. The rest of the enamel was normal to all appearances, and yet the surface, both of the white and the apparently normal enamel, was readily pared with a lancet. The lobe in which the other tooth was embedded had not fermented, and the enamel also seemed normal, but here again the outer surface of the tooth enamel was distinctly softened. These teeth were then washed in water and kept in some of my saliva at body temperature for two weeks. At the end of five days there was a decided rehardening of the enamel surface, and the white area of decalcification on the tooth mentioned had half disappeared. At the end of ten days the enamel could no longer be scratched with a lancet; at the end of two weeks the white spot of decalcification had almost if not entirely disappeared, and both teeth appeared perfectly normal.

That saliva does possess the power of restraining enamel from carbon dioxid decalcification was proved as follows: A sound extracted tooth was placed in a sparklet or automatic soda water former, where the liquid within could be charged from a carbon dioxid cartridge. Thirty cubic centimeters of saliva were added which had been obtained by chewing rubber. The saliva was then charged with carbon dioxid and the sparklet placed in a culture oven at a temperature of 98 F. for thirty days. At the end of that time is was taken out and appeared unharmed. The tooth was then washed with a little ether and replaced in the syphon with distilled water. This water was then charged with carbon dioxid and the flask replaced in the culture oven for twenty-four hours. At the end of that time the enamel showed a chalky decalcification that could be scaled off with the finger nail.

This protective power of saliva is also exerted against lemon, orange, grape, grape fruit, strawberry, rhubarb and cherry, the special action of which was the subject of a paper[1] I wrote in 1908.

These experiments with extracted teeth, weak acid solutions and tests with a sharp lancet in the hand, while suggestive, seemed to me not sufficient to establish so reactionary a doctrine; so while morally convinced of the truth of my assertion that softened enamel could reharden, I immediately started to perfect a machine that would show in the minutest degree just how far a given force would drive a standard punch into sound enamel, partly decalcified enamel and rehardened enamel, if it did reharden, from the effects of slight decalcification. I will not dwell on the discouraging task of making good mechanics work with a scientific conscience. They would not do as they were told, and much of the adjustment had to be done by the deviser of the instrument, which from at first having an error of 1/500 of an inch, finally developed into a micro-dynamometer that could deliver 475 pounds' pressure on a punch, the penetration of which could be measured up to 1/600,000 of an inch. Something approaching this accuracy was necessary, as it was found experimentally that the scope of the average test lay usually within 1/10,000 of an inch. It was, however, decided to set the register so that it would measure in units of 1/300,000 of an inch, which as can readily be seen could be reduced by a table to microns or tenths of microns, one micron being equal to 1/25,000 of an inch, twelve of the machine units, therefore, being equal to one micron. The pressure was given by a mercury gauge to which the punch was attached. A micrometer screw supporting the anvil on which the specimen for testing was to be placed was strongly connected by castings and heavy drawn steel rods beneath the mercury gauge and punch. The pressure was applied to the specimen by placing it on the anvil and raising the anvil by the screw up against the punch until the mercury marked the pressure desired. The penetration of the punch into the specimen was made known by a microscope equipped with a specially constructed filar micrometer, which microscope was solidly screwed to the anvil. This microscope was then adjusted and set so that it could accurately divide into the desired number of parts a glass scale attached to the punch. By this device, all error in the use of the machine was largely thrown out, since only the relation between the punch and the anvil was within the scope of measurement.

In making the various tests three punches are used: a heavy steel punch with a flat hardened circular point 1/50 of an inch in diameter: an iridium pointed punch 1/50 of an inch in diameter for testing acid erosion; it will stand up to 25 pounds without showing compression; a diamond-pointed punch with a circular, flat point 1/50 of an inch in diameter that can be used in acid solutions and will also readily stand 100 pounds' pressure. Twenty-five pounds' pressure with the diamond point will give a penetration equal to 75 pounds with the steel point. This is no doubt due to the greater sharpness of the diamond edge over the steel.

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[1] Read before the Harvard Odontological Society, March 7, 1908.

If, therefore, the specimen is so adjusted and set under pressure that there will be no give between it and the anvil, it is possible to determine accurately within, say, one-tenth of a micron, just how far the punch would penetrate under a given pressure. For instance, the specimen is carefully ground with a Reichert section grinder so that there is a flat, large base. A small spot on the top of the enamel is ground parallel to the base. This forms the area to be tested. Any pressure exerted on the enamel spot by the punch is directly expended on the enamel, without any side give between the base of the specimen and the anvil. The specimen with parallel sides is placed on an agate slab and the slab placed on the anvil. The punch is adjusted near the edge of the ground enamel and given a pressure of 5 pounds. A reading by the microscope attached to the anvil is then taken on the scale attached to the punch. The pressure is then raised to the desired amount, say 75 pounds, for a given time, and then the pressure is reduced again to 5 pounds and another reading taken, the difference on the scale representing the penetration of the punch. To shift the specimen under the point for the different measurements, the agate slab is moved, not the specimen on the slab. This eliminates variations in the spring of the specimen, since the compression of the parallel slab on the anvil under a given pressure will always be the same.

Five or more measurements are usually made for each reading and the average taken. By this means the density and strength of normal enamel can be shown, as can also the variations from the normal enamel caused by strong acids, water solutions of acids, saliva, fresh and stale acid saliva solutions, and the recovery of enamel from the effects of a slight acid decalcification and the rehardening of its surfaces after it has been ground with a stone.

All analytical analyses of saliva heretofore have been hampered by the fact that the investigator of it first started by chemically breaking it up, thus largely destroying it as saliva. All analytical investigation of saliva from a dental point of view, up to the present time, has been of little value owing to the fact that normal saliva may be alkaline to lacmoid or congo red, neutral to litmus, and acid to turmeric paper, all at the same time. How saliva reacts to lacmoid, litmus or turmeric may be purely of academic interest, but how it may react on enamel and dentin is a vital question that interests every man that lives, and this machine has, it is hoped, made it possible for enamel to be its own indicator of how a saliva may affect it. Since the first days of physiologic study, saliva has been a most tempting field for investigation because it is the body secretion most easily obtained in a living state. It ought to be at least of equal value to the diagnostician as urin, but up to the present time it has not been. This may lie in the fact that saliva is a living substance, and urine is an effete product that lends itself to a chemical analysis that would absolutely destroy saliva as saliva. Chemical analysis that breaks up the individuality of living saliva is of little more value in showing the vital action of saliva than fried chicken would be in showing the beauties of a cock fight.

I am far from discouraging saliva analysis of any kind. Epinephrin may illustrate the living secretion of the suprarenal capsule or it may not. Salivary extracts or chemical products are interesting but inconclusively related to the living action of the secretion and, therefore, while enzymes of a curious and even therapeutic nature may be extracted from saliva, no one can prove that they justly represent the action of the living secretion unless some means are devised to make control tests with the living saliva that show the corresponding action. This machine, it is hoped, will make it possible to test on tooth enamel the acid restraining power of various living salivas in relation to a standard water solution of acid. Salivas vary in this power. The same saliva may vary at different times, apparently according to the condition of the patient.

The conditions then are as follows: During sickness the teeth, from clinical experience, are known to decay. This may be due partly to acid medicine or lack of care, but with every allowance for these sources of error, it seems to be well established that severe or chronic illness in some way may render the teeth sensitive to deterioration. Formerly it was supposed that some product was extracted from the enamel through the blood circulation, but this is now fully disproved by the histologic knowledge that human tooth enamel is, to all intents and purposes, absolutely shut off from the blood current. If a relation between approaching sickness and a loss of acid protecting power in the saliva could be established, a beginning in the diagnostic testing of the living saliva would have been fairly inaugurated. Take for example, the test that was made on a specimen of tooth enamel that I use for an illustration. One side was ground to a flat, broad base, on the other side the enamel was ground in a small corresponding parallel plane. This was placed on the anvil of the machine and raised up against an iridium point 1/50 of an inch in diameter until a pressure of 5 pounds was reached. A reading was then taken on the micrometer scale and noted. The anvil was raised up and down repeatedly until all give between the specimen and anvil disappeared, and the 5 pounds' pressure always gave the same reading. Then fresh lemon juice and water 1 to 100 was placed on the specimen around the point and the point relaxed so that the fluid could readily get underneath. At certain intervals of time the pressure of 5 pounds was tried and a reading taken which showed a loss of tooth structure as follows:

| | | | |
|---|---|---|---|
| 2 | minutes | 0.8 | micron |
| 5 | " | 1.2 | " |
| 10 | " | 1.4 | " |
| 35 | " | 2.3 | " |
| 60 | " | 2.8 | " |

Thus, in one hour there was a loss of 2.8 microns of tooth enamel. This same test was then made on the same tooth enamel with a fresh saliva solution of lemon juice, 1 to 100. This solution turned litmus red and was distinctly sour, and yet after an hour's application the enamel showed a loss of only 0.3 of a micron. We might, therefore, express the restraining factor of that saliva as 28 : 3 or 9. Numerous other tests have been made of a similar nature and all seem to give consistent figures. They almost invariably seem to prove the power of saliva to restrain the action of lemon juice on enamel. They also show that some enamels are much more resistant to decalcifying action than others.

As an illustration, another test might prove interesting: This specimen was ground longitudinally for a base along its axis and a small parallel plane ground on the enamel of the opposite side. A solution of 1 to 100 lemon juice and water applied for an hour dissolved 1.0 micron. Saliva and lemon juice, 1 to 100, applied for sixteen hours, showed no loss of tooth tissue at all. It was then tested with the steel punch 1/50 of an inch for density and was found so softened that from 60 pounds to 70 pounds' pressure could not be obtained. The softened enamel simply refused to support the punch under such a pressure. The specimen was then placed in fresh saliva and set in the culture oven at blood heat for seven hours, the saliva being changed every half hour. At the end of that time the tooth was again tested with the steel punch and was found to have so hardened that 75 pounds' pressure was readily withstood and a various penetration noted of 3.5, 2.8, 3.2, 4.5 microns. No doubt it would have hardened up more but the various testings had so strained the specimen that it was considered advisable to continue with others. The great softening and hardening apparent in this last test is no doubt due to the enamel being very thin so that the variations were partly due to the dentin underneath. But tests on two bicuspids extracted from the same mouth for the purpose of regulation, with perfect enamel, to all appearances show conclusively that enamel has an extraordinary power of hardening and softening under various conditions, although no acid solvent at all was used.

These specimens were soaked for about ten days in a 1-to-10 dilution of liquor formaldehydi in water. They were then cut flat at the neck and 1/80 of an inch ground off the cusps of Specimen 1, and 1/50 of an inch ground off the cusps of Specimen 2. The diamond point was used at 25 pounds' pressure.

Specimen 1 (buccal cusp) when freshly ground gave an average softness of 1.5 microns, the readings being: 1.1, 2.0, 1.2, 1.8, 1.8, 1.2.

Specimen 2 (buccal cusp) gave an average softness of 1.6 microns, the readings being: 1.2, 1.6, 1.6, 1.5, 2.1.

Specimen 1 (lingual cusp) gave an average penetration of 1.2 microns, the readings being: 1.3, 1.2, 1.3, 1.2, 1.0.

Specimen 2 (lingual cusp) gave an average penetration of 1.1, the readings being: 1.3, 0.9, 1.1, 1.3, 0.9.

Here in two specimens, apparently of similar teeth from the same mouth, we find the buccal cusps having the same hardness with 0.1 of a micron, and the same with the lingual cusps; while the lingual and buccal cusps on the same teeth show a variation in penetration of from 0.5 to 0.3 micron respectively.

I speak of this comparison to show the consistency of the machine measurements. I shall now proceed with the tests on Specimen 1:

After being tested the specimen was placed in distilled water for three hours and again tested. The buccal cusp had softened from 0.3 micron to 1.8 microns, the measurements being 1.4, 2.4, 3.9, 1.9. The lingual cusp had not changed, showing a penetration of 1.2 microns, measurements being: 1.5, 1.3, 1.3, 1.3, 0.8.

The tooth was then placed in J. H. saliva over night.

In the morning the buccal cusp showed a slight hardening of one point, to the average hardness of 1.7, the measurements being: 1.8, 1.3, 1.8, 2.2, 1.6.

The lingual cusp had hardened 0.2 to the average of 1.0, measurements being: 1.1, 1.2, 1.0, 0.8, 1.1.

The tooth was allowed to stay in J. H. saliva, at room temperature, all day (nine hours) and tested again, when the buccal cusp had hardened seven points, to the average of 1.0, measurements being: 0.9, 0.8, 1.2, 1.0, 0.9, while the lingual cusp had hardened 0.1 to the average density of 0.9, measurements being: 0.4, 0.7, 1.1, 1.3, 1.1, 0.7. In this instance, the buccal cusp started at 1.5, softened to 1.8, and hardened to 1.0. The lingual cusp started at 1.2 and stayed the same, or consistently hardened to 0.9.

It was decided to try the saliva of my assistant on this specimen.

The specimen was placed in incubator, 98 F., with A. J. F. saliva and a little ether for thirty-six hours, and buccal cusp showed a softening of 0.5 or an average of 1.5, measurements being: 1.7, 1.4, 1.2, 1.4, 1.5, 1.5. Lingual cusp remained the same or 0.9, measurements being: 1.0, 0.8, 0.8, 1.2, 0.6. The specimen was kept in A. J. F. saliva for a day longer, when the buccal cusp showed a further softening of 0.7, penetration being 2.2, the measurements being: 1.4, 3.4, 1.5, 2.0, 2.6. The lingual cusp showed a softening of 0.3, having an average penetration of 1.3, measurements being: 1.6, 1.6, 1.4, 1.1, 1.0.

The specimen was then placed in a 2 per cent dilution of liquor formaldehydi in water for sixteen hours, room temperature, when the buccal cusp was found to have hardened 1.2 to 1.0, measurements being: 1.3, 0.8, 1.0, 1.0, 0.8, and the lingual cusp had hardened from 0.1 to 1.2, measurements being: 1.4, 0.8, 1.0, 1.8, 0.9.

Specimen 2: The buccal cusp showed a hardness of 1.6, the lingual cusp a hardness of 1.3. It was placed in A. J. F. saliva and 2 per cent ether in incubator at 90 F. for three and one-quarter hours and tested again. The buccal cusp had hardened 0.5 points to 1.1, measurements being: 0.9, 1.0, 1.2, 1.2, 1.2. The lingual cusp showed a hardening of 0.2 points, having an average of 0.9, measurements being: 0.8, 1.0, 1.3, 0.9, 0.8, 0.9. The specimen was then replaced in the same saliva in the incubator for two days and the buccal cusp showed a further hardening of 0.1 point, giving a penetration of 1.0, measurements being: 0.5, 0.8, 1.2, 1.2, 1.0, 1.2, 0.8.

The tooth was then placed in J. H. saliva, at room temperature for eight hours, when the lingual cusp showed a softening of 0.6 point or an average of 1.5, measurements being: 1.2, 1.4, 1.1, 1.9, 1.9, 1.7, 1.0.

The tooth was then placed in A. J. F. saliva, in incubator for fifteen hours, when the buccal cusp was found to have softened 3 points to 1.3, measurements being: 1.4, 1.3, 1.3, 1.2, 1.2, while the lingual cusp had hardened 5 points to 1.0, measurements being: 0.9, 0.9, 1.0, 1.1, 1.1.

The specimen was put in A. J. F. saliva in incubator and the saliva was changed every half hour. In four hours, the buccal cusp had hardened 2 points to 1.1, measurements being: 1.2, 1.2, 1.1, 1.2, 1.0, 1.2, 1.0, while the lingual cusp remained about the same, showing also a penetration of 1.1.

The specimen was then placed in A. J. F. saliva and 2 per cent ether in incubator for twenty-four hours, when the buccal cusp was found to have softened from 0.5 points to 1.6, measurements being: 0.9, 0.8, 2.1, 1.4, 2.8, 1.6, 1.4, and the buccal cusp had softened 0.2 point to 1.3, measurements being: 1.4, 1.3, 1.2, 1.2, 1.3.

Then 5/1000 of an inch was ground off the tooth surface and the cusps were again measured to see how they would compare with the original tests. The buccal cusp showed an average penetration of 1.7, one more than the original test, measurements being: 1.7, 1.8, 1.6, 1.8, 1.6, while the lingual cusp showed exactly the same hardness, having a penetration of 1.1. The tooth was then placed in the incubator with A. J. F. saliva changed every half hour for six hours. The buccal cusp hardened 0.4 point to 1.3, measurements being: 1.9, 0.9, 1.2, 1.3, 1.0, 1.5, 1.2. The lingual cusp had softened 0.1 point to 1.2, which was practically remaining the same, measurements being: 1.2, 1.4, 1.2, 0.8, 1.2, 1.4.

The tooth was then placed in A. J. F. saliva and ether in incubator over night, when the buccal and lingual cusps showed an equal penetration of 1.3, the buccal measurements being: 1.4, 1.0, 1.5, 1.4, 1.3, and the lingual measurements being: 1.2, 1.2, 1.4, 1.2, 1.4.

This softening and hardening of enamel has a very practical bearing in relation to mouth cleansing and the use of brush and dentifrices. Enamel that in its hardest state would only show insignificant wear to dentifrice grit and friction in a temporarily softened state may, through a good brushing with grit, lose a very material amount of tooth structure. This softening and hardening may readily account for the reason why some patients, especially those fond of fruit, wear their teeth down to the gum at a comparatively early age. The mere friction of mastication is sufficient to take off a layer of enamel softened by fruit or vinegar, which if left to itself might reharden.

I have made hundreds of tests with this machine. but as these are largely of interest to dentists, I will reserve them for another paper, where there will be ample space for the tables that should, of necessity, accompany my findings concerning the variations in the action of enamel, which variations are so extraordinary as to be almost beyond belief.

But that enamel will harden and soften within certain limits, I am convinced. And that this hardening and softening is influenced by the saliva and foodstuffs is to me beyond the question of a reasonable doubt. This action I also believe may occur in dentin, but my tests concerning this latter are not sufficiently numerous to serve as a basis for a positive assertion.

For those who are interested I give a more detailed description of the microdynamometer for measuring the hardness and softness of tooth enamel. This machine can measure to 1/600,000 of an inch just how far a standard punch will be driven into enamel by a standard force.

It is now gauged to measure to 1/300,000 of an inch, which being 1/12 of a micron, the figures are mathematically reduced by a table of 250/1000 of an inch, or tenths of microns, so that as microns or tenths of microns, they can be easily understood at a glance. The tenth of a micron is the unit of measurement used in the table.

The pressure is given by a mercury gauge (9) to which the standard punch (2) with glass scale (3) is attached.

The pressure is applied to the specimen (1) by placing it on an agate slab with parallel sides (4) and the slab on the anvil (5) and raising the anvil by the micrometer screw and ratchet wheel (8) up against the punch until the mercury gauge makes the pressure desired.

The penetration in the specimen is made known by a microscope (6) which is equipped by a specially constructed filar micrometer (7), which microscope was solidly screwed to the anvil (5). This is then adjusted and set so that it can accurately divide into the desired number of parts the 1/1000 of an inch divisions on the glass scale attached to the punch.

A counterweight (10) makes the mercury gauge start at twenty-five pounds' pressure, as the mercury gauge is not accurate before that pressure is obtained.

(11) Electric lights for lighting the specimen and illuminating the microscope.

(12) Ratchet screw for raising or lowering the glass scale attached to the punch.

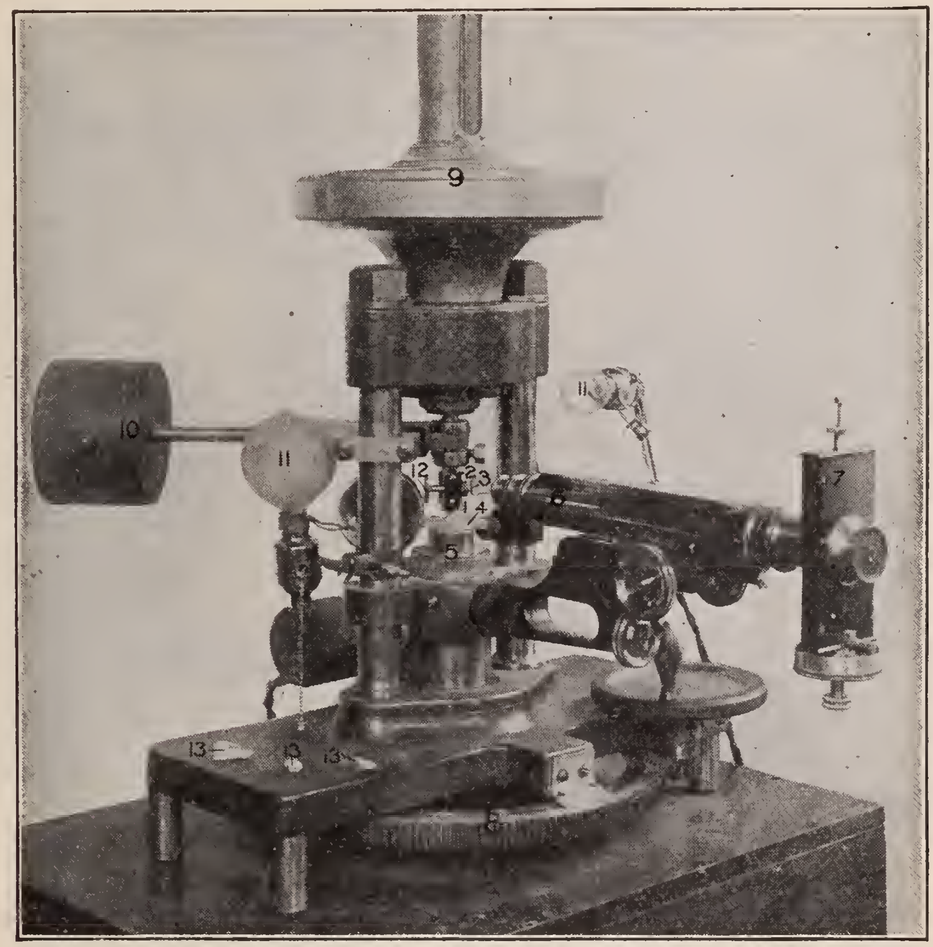

Fig. 1.—Full view of microdynamometer with the exception of the top of mercury gauge.

(13) Various tooth specimens ground and prepared for action.

If, therefore, the specimen is so adjusted and set under pressure so that there is no give between it, the slab and the anvil, it is possible to determine accurately within, say, 1/12 of a micron just how far the punch can penetrate under a given pressure.

For instance, the specimen is carefully ground on the microscope grinder until it has a flat, large base and a small spot on the top of the enamel ground parallel to the base. It is essential that the spot tested should be absolutely parallel to the base in order to avoid side give.

Three punches are used: A hardened steel punch 1/50 inch in diameter, designated as A. This is used purely for ascertaining how far a penetrating force under varied conditions will drive it into the enamel.

A pnch consisting of an iridium point set into a brass rod which is used to determine the action of acids on enamel, whether erosion or swelling.

A diamond punch designated as D, ground flat 1/50 inch in diameter, and used at a pressure of twenty-five pounds.

All of these punches are first set on the specimen, placed on the anvil at a pressure as high or higher than they are to be used on the test, as a preliminary to any measurements being taken.

The A punch, unless otherwise stated, will be first set at 75 pounds, then the pressure reduced to nothing. Then, without moving the specimen in the agate slab that is ground parallel, the slab is moved so as to place a new area of enamel under the point. The punch is then placed at 5 pounds' pressure and a reading taken through the microscope on the glass scale attached to the punch. The pressure of 75 pounds is then exerted for ten seconds, when the pressure is reduced to 5 pounds and a reading taken. The difference is the penetration.

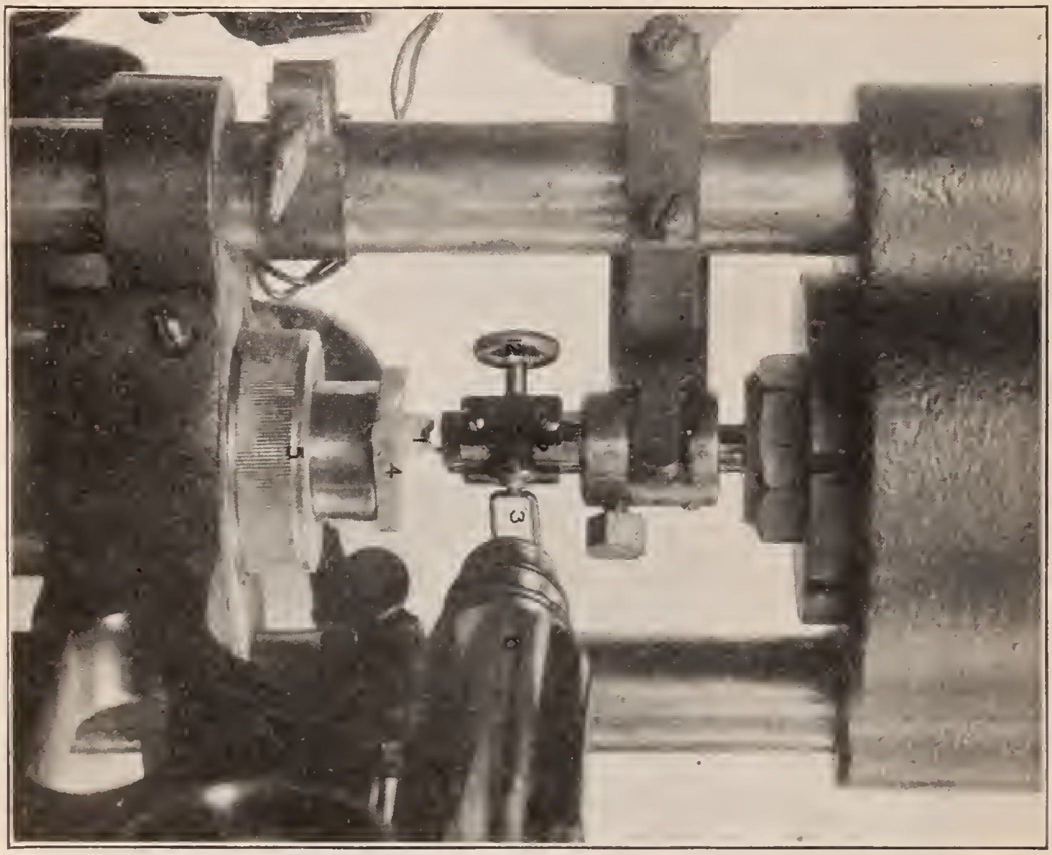

Fig. 2

For various readings on the same enamel surface during a single test, the agate slab is moved as desired, but the specimen is not moved on the slab, as that would necessitate a new setting.

The same procedure is used with the D punch as the A or B punch. The times and pressure varying according to the test desired.

The same procedure is followed with B punch where acid action on enamel is to be determined. The specimen is set at 10 pounds, then reduced to 5 pounds and released, and again placed at 5 pounds until the same reading is always obtained. Then the acid is applied and at desired intervals, the point is placed on the enamel and the readings taken, showing erosion or swelling or a negative result as may be the case.

A negative result with the B punch may be followed with tests with the A or D punch that show softening to an astonishing degree.

### ABSTRACT OF DISCUSSION

Dr. G. V. I. Brown, Milwaukee, Wis.: I believe that when Dr. Head has established the facts pertaining to saliva and enamel as he has presented them today, and there seemslittle reason to doubt that they will be established, and when this knowledge may be fitted into its proper niche in the greater structure that is building in the pathology of the different bodily divisions, then saliva will have a significance that we have never before accorded it.

Dr. C. J. Grieves, Baltimore: I did some work for the American Society of Orthodontists on decalcification of enamel, and I soon found that I knew nothing about the saliva and could not find many who did know anything about it. There are many things said, but there is little known as to the difference between living and dead saliva, if I may use that term. I found that enamel reacted very differently to these two kinds of saliva. Dr. Head had done some work along this line in regard to the ordinary aqueous solution and an acid solution in the saliva. The mucoid element in saliva is commonly condemned, and rightly so in the carious mouth in which the glycogen or carbohydrate portion is over 25 per cent, for it then becomes the normal habitat of that caries-producing organism, the decalcifying organism; I believe that normal mucus in the normal mouth is what makes for tooth protection, as it has already been shown to do in the gastro-intestinal tract. That is what makes the difference between the saliva solution and the aqueous solution.

I further found that all alloys were disassociated electrolytically in the mouth and we might well reason that enamel is decalcified by the same process which shortly destroys smooth surfaces of alloys in the mouth; the only substances not subject to disassociation are the mucoid or gelatinous substances; the common mouth mucus belongs to this group, and I believe out of the mouth it protected the enamel from acid disassociation in Dr. Head's test-cases, as I am sure it does by a film in the mouth. We all have seen acid decalcifications produced by orthodontia appliances. These decalcifications are said to be rubbed out by prophylaxis, but I do not believe this. I think that the intercement substance has been destroyed by acid between the enamel rods and the interstices left are filled with mucus and the decalcified spot apparently disappears. If it is desiccated, it will then show up as an opaque spot. I firmly believe in the protective action of vital mucus in normal cases, but not when there is over 25 per cent carbohydrate and the mucus is acid from fermentation. In erosion the mucus is nearly all in solution and there are few films on the teeth. Every normal tooth is covered by an alkaline film; where there are few films and the mucus is in solution, the action of acid sodium phosphates and calcium phosphates produces erosion.

Dr. Joseph Head, Philadelphia: I have done this hundreds of times with the same characteristic results. I have convinced myself, and now I want somebody else to try it.

Dr. E. S. Talbot, Chicago: Dr. Latham and I have been working on this for perhaps ten or twelve years from the internal point of view. We took the ground that these changes in the enamel were due to changes in the blood, and we actually demonstrated pathologic conditions of the dental pulp and the tissues which, as far as we went, are no doubt correct, but that work does not interfere at all with this work that Dr. Head is doing. I am not sure but we shall find that the work which Dr. Head is doing here will to a great extent solve the problem of decay of the teeth. That softening of the enamel and dentin take place through diseases of the body, there is no question. We have all seen enamel soften and the teeth decay very rapidly in tuberculosis and other diseases; the point was to prove that softening and decay did take place—I believe that they do—by establishing a degeneration of the dental pulp and the tissues of the cementum and enamel. The work which Dr. Latham and I have been doing in demonstrating that the softening of these tissues may take place from systemic conditions, added to Dr. Head's work, will help to solve this problem. It seems strange that this softening and hardening should take place in so short a time.

Dr. Joseph Head, Philadelphia: I cannot explain how these things occur, because I do not know. I am simply in a maze of astonishment. I am convinced that enamel will harden and soften. Since this has come to my attention, I have noticed spots that apparently seem to disappear, and I have had other dentists make the same observations.

If that spot disappears, would not this prove that the enamel is not the dead, inert substance that we are supposed to consider it? I cannot help feeling that the enamel is undergoing a series of changes, a sort of unseen action in itself, and that it is capable in its own molecular being of softening and hardening, something similar to the Bermuda rock, which hardens under certain conditions. It is nothing unusual for crystals to harden and soften again.

# PYORRHEA ALVEOLARIS*

BY DR. CLAUDE E. MARKEY, PASADENA, CAL.

GENUINE Pyorrhea Alveolaris, a disease whose diagnosis is certain, but whose prognosis is uncertain. A disease of the tooth socket, in which a flow of pus from the alveoli is the chief diagnostic symptom, other characteristics being inflamed gums, looseness of tooth, and a tenderness to pressure. A calcareous serumnal deposit is generally found upon the root, firm, barnacle-like, though I have seen cases where the roots were as clean and smooth as though polished, yet pus was very much in evidence.

In my early practice I considered pyorrhea as simply a disease of filth of the oral cavity, but from study and close observation, I now believe it to be an oral manifestation of some constitutional disease, as a result of auto-intoxication or self-poisoning, and that the intestinal tract plays a more important part as regards the primary cause than does the oral cavity.

The conditions around the teeth as regards malocclusion, irregularity, rough margins of fillings or crowns, poor contacts, abuse by toothpicks and neglect of oral hygiene, to be sure, may be considered as secondary or predisposing causes.

It is claimed that a tooth afflicted with pyorrhea, if extracted, gums will heal and that ends the pyorrhea. To be sure, it ends it as far as that tooth is concerned, but what becomes of the poison? What becomes of the primary cause?

Nature must have some outlet for this poison, and when the excretory organs are overworked (as is usually the case), then the weakest tissues suffer, tissues of poor circulation, of poor stimulation, and the end organs and joints afford a very favorable location for its lodgment, especially the immovable joint formed by the cone shape root and its socket, the joint known as "Gomphosis."

If pyorrhea were simply a disease of filth of the oral cavity, then why is it not in evidence in the mouths of young people? As in accordance with filth, it should be in evidence in some cases as early as the fifteenth year; and the filthiest mouth I ever treated was for a young man twenty-two years of age, who had never had a toothbrush in his mouth and whose gums would bleed upon slightest touch, yet four treatments (first two being very short) were sufficient to place his teeth and gums in good condition, as there was no evidence of pus, no pyorrhea, and but two cavities in inferior first molars, the young man being a hard-working, temperate day laborer and in good general health.

Why does pyorrhea recur, as is often the case, after a supposed cure, after thorough scaling and local treatment, and where the patient has co-operated with the dentist as regards daily care of the teeth, use of dental floss, and massage of gums? Why does it recur unless there be some hidden cause not yet fully understood, together with the fact that the dentist was treating the symptoms alone, by local treatment, instead of treating the symptom and deep-seated cause by local and constitutional treatment?

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*Read before Pasadena, California, Dental Society

There are any number of so-called remedies for internal constitutional treatment, but can you show me any disease that drugs, taken internally, ever cured? Nature cures, not drugs.

According to my observations, pyorrhea patients belong to one of the following classes:

1. Those of poor circulation;
2. Those who drink very little water;
3. Those who are hearty eaters (especially starchy foods);
4. Those who are rheumatic or gouty;
5. And last, and probably most important class of all, those who are constipated and take no regular form of exercise.

A well-regulated diet, drinking plenty of water (though not with your meals), taking plenty of exercise, thoroughly masticating your food, avoiding tea, coffee, liquor or tobacco, in conjunction with thorough, regular prophylactic treatment of the teeth will, I believe, if taken in time, not only cure pyorrhea and catarrhal troubles, but many other diseases known under different names, all being a result of auto-intoxication (self-poisoning), and is it any wonder there is so much sickness when one but considers the condition of the average intestinal tract and the general neglect of the proper means of flushing and regulating it? The old saying, "Keep your feet warm, and your head cool, and your bowels open," is truer today than ever, and add to that, be temperate in all things, abolish fear as to being sick; drink plenty of water, take regular exercise, and, if one does not feel well, stop eating, stop drugging, drink plenty of hot or cold water, take hot baths, internal and external, and in some ailments rub body with alcohol and go to bed and rest, thus giving Nature a chance to perform her duty. Be fair, play fair with that most wonderful and most neglected piece of machinery known, and she—Nature—will give to you the best there is in life—health; and unless you do play fair you need never expect perfect health.

I believe the study of physiology to be one of the most important studies for the dentist of today, and of the future. The saliva (that wonderful indicator of health conditions, being a secretion from the salivary and mucous glands, and indirectly from the blood) plays an important part either in predisposing, or as an agent of immunity as regards dental caries, and the precipitation of calcareous deposits on the teeth, but just how it does it is yet undiscovered unless it be a condition of general health, hence more resisting power; but the time is not far distant when dentistry and medicine will go back to their A, B, C's and preach the gospel of general health.

Did it ever occur to you that Nature plays no part in the filling of teeth (one part of the body that she cannot repair), but in the treatment of inflamed gums and pyorrhea she stands ready to assist you if you will but give her the opportunity? Also, the fact that year after year more teeth are lost through pyorrhea than through decay, hence does it not appeal strongly to you that more attention should be given to this disease, and if it is not influenced by general health and auto-intoxication, then what does influence it? Every dentist (even though a thorough cleaning of the teeth and a thorough scaling of the roots is about the dirtiest work in dentistry) should do justice to his patients along this line or else call patients' attention to it and send them to some one who will be thorough; as I believe no greater service can be rendered than to thoroughly clean the surfaces of the teeth and treat their foundations (the roots), as we all should realize that we cannot build a lasting superstructure upon a poor foundation.

## METHOD OF MAKING WAX INLAY PATTERNS BY THE DIRECT METHOD

BY M. M. BROWN, D.D.S., MACON, MISS.

In making the wax inlay pattern by the direct method in deep proximo-occlusal cavities in molars and bicuspids, soften wax to desired consistency, press into cavity with the fingers and immediately apply pressure to same with a blunt instrument or amalgam packer, condensing same as you would amalgam. This will almost invariably give a perfect outline of base of cavity whether a matrix is used or not, and if there should not be a sufficient excess of wax to fill depression made by condensing instrument, quickly soften a small amount of wax, preferably a softer one and press to place.

If this is done quickly it will usually unite with wax already in cavity, or you can remove pattern and add to same where needed.

## SELF PRESSURE ANESTHESIA

BY WILLIAM I. PRIME, LACONIA, N. H.

After removal of all carious matter from cavity, disinfect and place one novocain hypodermatic tablet upon pulp exposure or entrance to canal. Moisten with drop of distilled water. Cover tablet with warm yellow wax and fill cavity with unvulcanized rubber, leaving large excess of rubber for patient to close jaws upon (when occluding tooth is in position).

Instruct patient to close jaws easily at first and to increase pressure according to the anesthetic effect. By this method the patient is able to gauge his own pressure anesthesia, the average time being from five to ten minutes for complete pulp anesthesia, when the closure of the jaws with increased pressure produces no pain. Pulp may then be removed without a second application, providing sufficient time is allowed, to secure satisfactory results and no pain.

# A CASE OF ARTHRITIS FROM DENTAL INFECTION*

BY H. C. KENYON, D.D.S., CLEVELAND, OHIO

Patient, Miss B.; aged about 20 years; unmarried.

The case was referred to me by Dr. Walter C. Hill to whom she had been sent for skiagraphs and examination by Dr. Alfred Maschke, who had been unable to locate an infection presumed to be the cause of an arthritis in the lumbar region of the spinal column and of a soreness in one heel and a lameness in the same foot.

Dr. Hill gave me a brief history of the case, calling attention to the spur on the heel and the trouble in the spine, and sent me the skiagraph showing the abscess at the apex of the upper left lateral incisor, with the request that I make an examination and report my opinion as to whether this abscess might be the source of the trouble and, if so, to recommend treatment.

Upon examination I found that pus had undoubtedly been present in varying quantities for a period of two years or more. I recommended an early operation for the excision of the denuded apical portion of the root of the lateral and the removal by curetting of all the carious bone surrounding the abscess. Under nitrous oxid and oxygen anesthesia administered by Dr. Ziegler, the writer did this operation on May 16, 1911. The operation was not unusual, except that a larger area of carious bone was encountered than the average case presents, which necessarily lengthened somewhat the period of repair.

The results of the operation were:

1. The tooth was saved and further damage to other teeth and adjacent bone averted;

2. At the end of five weeks the trouble in the patient's back had permanently disappeared, and the spur on the heel was partially reduced and the soreness and lameness of the foot were definitely improved.

At fifteen weeks the foot was practically normal again. I have seen the patient recently and she reports no recurrence of the trouble.

The case received no other treatment than that reported above, which is considered fairly conclusive evidence that the alveolar abscess was the only source of infection causing the arthritis.

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*Read before the Cleveland Dental Society, 1912.

## ALL ARTICLES COPYRIGHTED

Beginning with this, the July number, we have resumed the practice of protecting the entire contents of THE DENTAL SUMMARY by copyright.

This course has been made necessary by the use, without consent granted or asked of some of our articles for commercial purposes by manufacturers of proprietary remedies that happened to be favorably referred to therein.

In taking this action it is no part of our purpose to attempt to prevent the republication in any reputable dental, medical or lay journal of all or any part of the contents of THE SUMMARY, and the privilege for so doing will be granted freely on request.

It is our purpose, and the whole of that purpose, to prevent the use of any and all of our articles in any manner that would be displeasing to the authors of them.

# PRESIDENT'S ADDRESS*

BY MARCUS L. WARD, D.D.SC., ANN ARBOR, MICH.

THE VERY nature of the public service that the Michigan State Dental Society assumes to supply makes it, to about fifty per cent. of the total number of dentists in the state, a curiously needful, and to the other fifty per cent., a highly responsible servant of dentistry in Michigan. The Michigan Dental Association, the former name of the present organization, was incorporated in the year 1876, and had stated in its Articles of Incorporation that the object of the association was "to promote the Science and Art of Dentistry in all its branches." There was nothing to indicate that the association was organized for the benefit of any given percentage. In the constitution of the same organization the object given was "to cultivate the science and art of dentistry and its collateral branches; to elevate and sustain the professional character of dentists, to promote among them mutual improvement, social intercourse and good feeling, and collectively to represent and have cognizance of the common interests of the dental profession in the state."

The Michigan State Dental Society has stated in its constitution as its object, "to promote the public welfare by the advancement of the dental profession in education, science, mutual fellowship and good feeling, by bringing into one compact organization all the dental societies of the State of Michigan by the advocacy of proper legislation, and by co-operation with the medical profession in all matters of mutual interest and advantage to the people of the state."

To the fifty per cent. of the profession who are not members of the society, and many of whom look upon it with more or less curiosity, these objects of Articles of Association are not known at all. To the other fifty per cent. who are members, they are known, but little more, but generally supposed to be something advocating association for the benefit of the dentists. This was largely true with the Michigan Dental Association as is shown by its Articles of Incorporation, its membership, and its activities. The principal differences between the *older* organization and the *newer* one are represented in the objects of association of the latter, and are about two in number: First, to bring the dental societies of the state into one compact organization; second, to co-operate with the medical profession in all matters of mutual interest and advantage to the people of the state.

It is obvious that the new organization anticipates all the advantages of the old one by its frequent meetings, and in addition suggests taking part in securing proper legislation, and becoming solicitous of the welfare of the people of the state generally, and becoming better organized.

While the meaning of the objects of association of the older and the newer organizations might be construed to be the same, there can be little doubt in the average mind that the newer one suggests greater organization, greater development, and greater activities. The one should be a sequel to the other; organization should bring about development; and development should bring about greater activities.

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*Read before the Michigan State Dental Society, 1913.

As we convene here for this our Fifty-seventh Annual Session, five years after the re-organization of the society was begun, it may be well for us to analyze the paragraph which prefaces the constitution under which we work, and which contains, briefly stated, the particulars relating to the scope and aim of the work of the society. The statement has been made by a few of our members that the society was not organized to the extent that it might be, and one or two have appeared astonished because they suddenly and unexpectedly discovered that there were many qualified men, principally in the outlying districts, who were not members of the society, seeming not to realize that the problem had confronted the officers of the society before, and that our constitution was amended last year so as to place a membership committee among the standing committees. Such feeling, however, while it is keenly felt by all of us who have been active in bringing about some of the changes that have been made, is not viewed with alarm nor as an obstacle which we must surmount, but rather as an undelivered portion of the success which the society is achieving. When it is recalled to mind what the Michigan Dental Association was like at its last meeting at Saginaw in 1907, there should be little doubt that there was progress being made. The question of most concern to me at this time is, "Are we developing in the proper direction?" A review of the work of the society for the period between June, 1907, and April, 1913, seems to show that we are, with one or two exceptions, not only complying with our articles of association, but meeting the implied anticipations of the founders of the association. At the meeting in Saginaw in June, 1907, the treasurer of the society claimed to have the dues for 109 members for that year. The campaign that was conducted for the re-organization together with the efforts of the Treasurer, brought in dues from 267 members for the year 1908. Some of these men were in arrears for several years and often would have little thought of paying until the society came into their vicinity for its annual meeting. This, in fact, was the principal object of taking the meetings to many of the places where they were held. In 1912 we carried 602 bona-fide members and a great many more that were in reality members of the society, though they were not paid up where we could send them the official organ of the society. When it is considered that this increase has been made in the lower part of the lower peninsula, with no effort being made to organize the remaining parts of the state, there can be no doubt in the mind of even the most casual observer that a great deal has been done to interest outside men in society work.

So much for the membership. As to the general feeling towards the state association: there has been an equal change in this respect. In

1907 there were three large and one small societies running competitive programs with the state association, one of which was particularly antagonistic. The state association was regarded by a great many of the members of these societies as a little clique, and the remark was frequently and boldly made to this effect. Two of these societies boasted of holding larger and better meetings than the state association, and these boasts were pretty generally true. One of the most difficult problems to overcome at first was to change the feeling that existed regarding the payment of dues. These two societies that were holding such large meetings and presenting good programs were charging dues of only $0.75 and $1.00, and then only when the members attended, the remainder of the money necessary to run these programs being collected from the exhibitors.

Today this feeling is hardly noticed. Members are paying $3.00 dues for the reason that they see that it is being used for the good of dentistry in Michigan. A goodly number have already signified a willingness to have the dues increased to include a membership in the National Dental Society, and everything points to the acceptance of this increase by the whole society.

Three of the four societies that were running independent and antagonistic to the state society are the most loyal of any in the state, and the fourth is paving the way to become one of the largest and best components in the state.

Thus it would seem that the promotion of mutual fellowship and good feeling was gradually becoming what the founders of the organization intended it to be.

As to the organization being a compact one, there may be some difference of opinion in this respect, when the whole state is taken into consideration, but when it is called to mind that the northern part of the lower peninsula and the whole of the upper peninsula are in difficult railroad communication with the lower, and often the same is true with the larger cities in this territory, the opposite view will be taken.

There are at present ten societies in the lower part of the lower peninsula, of which eight make up most of the present membership of the state society. These ten societies have, with one or two exceptions, complied with the regulations of the state society for a period of three or four years without objecting to the plan of organization, and have from year to year become closer and closer united by the benefits they have derived as a result of the closer union. They have combined in demanding of the profession better oral hygiene. They have jointly presented the cause of oral hygiene to the laity. They have without exception favored Michigan's taking part in the campaign to reorganize the National Dental Association; they have, wherever the subject has been presented, recommended affiliation with the National Association; they have almost unanimously supported the proposed amendments to the dental law. In fact, they have for two or three years supported about everything that was for the good of dentistry in Michigan and elsewhere.

There is no friction between component societies. The Executive Council is, and has been, one of the broadest minded and most harmonious bodies that I expect ever to have the pleasure of working with. The books of the society, as kept by the secretary and treasurer, have frequently been acknowledged as the best in operation anywhere. It is true that there are one or two component societies that are not doing their share, but it is simply because the right men have not happened to get control of the management of these organizations, rather than any tendency to oppose the workings of the state organization.

All seem to recognize the need of a large and powerful organization in the state to best promote their interests. The tendency for one society to promote some measure without the support of the others has practically disappeared. Two years ago this was not so pronounced as was evidenced by the action of some of the societies regarding the then pending legislation, but today all are united on the very features upon which they were then divided. While it must be admitted that there is opportunity for improvement in many of these things, there can be no doubt that there is generally developing a feeling that in unity there is strength, and that the society is rapidly becoming the compact organization that it was intended to be.

In regard to co-operation with the medical profession in all matters of mutual interest and advantage to the people of the state, a great deal of the same comment may be made. Two years ago at our annual meeting in this city, Dr. Bunting gave an excellent paper on the relation of medicine and dentistry. He pointed out that from clinical observations and scientific data it is evident that the disorders with which we have to deal in the mouth are related in a vital way to the conditions of general metabolism. And, conversely, that many general disorders were related to and often originated by unhygienic or abnormal conditions of the mouth. He also pointed out that scientific developments of the past few years have brought out very emphatically the force and importance of this relation between mouth and general disorders, and that the need of co-operation of the medical and dental practitioner in the treatment of a large number of pathological conditions is felt more keenly than ever before. Some previous to, and much since the presentation of the paper, has been done to present these facts to the laity, and as fast as it was presented to the laity there has been a corresponding increase in the number of medical practitioners who were ready to acknowledge the good to come from a closer union between the dentist and medical practitioner. A close analysis of the conditions before and since the campaign for better oral hygiene was begun cannot help but reveal a change for the better from the standpoint of the dentist, the medical practitioner, and the people generally.

There is one feature of the changes that we have been expected to make with the reorganization that has been a disappointment to me, and while I am free to confess it, I have done all that I could do, along with the other things that have constantly confronted me, to correct it. It is the development of so few men in literary work. The benefits to be derived by the dentist himself by presenting papers, taking part in discussions, or interesting himself in some line of work that would demand study seem not to have been realized by but one district in the state. This one district, the First, has gradually increased its membership until it has a third of the members of the society, and at the same time has brought out a great many men, most of whom are young ones, who will be able to furnish any part of a program that may be anticipated. This district, however, has not, in my opinion, developed its men in proportion to the increase in its membership. Most of the other districts, including our own, have not done anything like as well as the First. The thought that usually comes to mind when a program is to be prepared is to get some one from outside who is a recognized authority on the subjects to be discussed, or at least is thought to be by some of the members, to furnish the greater part of it. This is one way to get information, it is true, and is an ideal thing to do once in a while to arouse enthusiasm, because a man from outside the district can often do things that those inside cannot. But, most men need the stimulus of having to present a paper in order to get them to thoroughly review certain subjects and develop a desire to keep a close watch of the current literature. There are certain districts in the state where it seems almost impossible to get a single man to present a paper on any subject, while in almost any other respect the members of these districts are all that one could ask for.

The excuse generally given for not wanting to present papers is lack of time, but this does not seem to be the real reason. The fact seems to be that these men have not made any effort at anything of the kind since they were in college, and they simply think they can't. If they were good readers and had a good conception of the opinions of other men on a certain subject, it should not be a difficult task to present a paper, and I believe it would be found so by most of our members, if they once made a start.

I trust that the incoming Executive Council will take up this matter the coming year and see if they cannot make a change for the better.

Another matter that I wish to call to the attention of the incoming council is the matter of membership. We made it possible last year to have a standing committee on membership and the committee was appointed. All of us realized that there were many men in the state who were eligible, but who were not members, and trusted that a committee whose duty it was to look after this one thing would be the solution of the problem. The committee has done some good work and I have no desire to cast any reflections upon them when I recommend to the next President of the society the present Chairman of the *legislative* committee for the Chairmanship of the *membership* committee for the next year. My work with him this year has convinced me that he has the situation in hand better by far than any other member of the society, and I cannot help but think that it would be a misfortune to ignore the fund of information that he has for this work. And to the council I most heartily recommend that they finance him in the work.

At this time, when I am to retire from the connection with the society that I have had in various capacities for the last five years, I want to mention again a matter that I have championed from the start and would champion again as vigorously as before if I had it to do over again. I mention the place of the annual meetings. It has been the policy of late to alternate with the meetings between Grand Rapids and Detroit, and at no time in the history of the society has there been more satisfied members. There was a time when it was necessary to take the meetings to various parts of the state for the purpose of stimulating interest locally, principally for the purpose of collecting the dues; but this is not necessary now with the number of component societies that we now have. There are at this time small inaccessible cities in the state that are making an effort to secure the next annual meeting of the society, and I trust that members located in these places will carefully consider what it means to the society before urging the council to accept their invitation, and not continue to ask that which is plainly to the detriment of the society, for the sake of gratifying the desires of a board of commerce. It has been common practice in other states to keep the meetings in centrally located large cities as far as possible. Experience has taught those in charge of the society's affairs that there was no option in the matter. Last year the Ohio State Dental Society took its meeting out of Columbus for the first time in nearly twenty years. Pennsylvania alternates between Philadelphia and Pittsburgh. New York almost invariably goes to Albany, Indiana to Indianapolis, Illinois to Springfield, Kentucky to Louisville, etc. In fact, it has been recognized by men of experience in society affairs all over the country that a meeting in a small place results in more or less of a failure, even if it is reasonably accessible. In this matter I most sincerely hope that there will be no change for the next few years at least.

There has been from time to time a feeling develop that there should be a more frequent change of the officers of the society. A similar feeling has existed at times regarding the location of the officers of the society. I have in my possession at this time a letter from a dentist from Saginaw calling my attention to the fact that there are no committeemen from that place or Bay City, and raising the question of whether it is for the best interest of the society not to have any from those places. The dentist in question suggests that there should be at least one representative from Saginaw, one from Bay City, and one from Flint, and that the Executive Council would be a good place for them. To those on the council who have been confronted with many of the perplexing questions, both local and national, that have grown out of the reorganization, such a letter will appear a good joke. But to many of the members of the society there will appear to be cause for complaint for the reason that they do not know much about the work that has to be done by the society at this time in order to maintain the reputation that most of the recently reorganized societies of the middle west have.

There is scarcely a place in the state that I have been but that I have been approached by some one who has a candidate for some office, and when asked what the candidate knows about the work, the reply usually is that he does not know much about it now, but will work into it all right. That kind of a suggestion would be all right with a well organized society, where there was only the regular routine work of the society to perform, but with a newly organized one, where there are many times the regular work of the society to do each year, there should be a large majority of the officers experienced men. Experienced not in municipal, financial or political matters, but in the workings not only of the society matters in our own state, but in other states as well. What can a President do in the appointment of committees when the society has selected a council from men who know nothing about the work they are expected to do? He can do it himself or let it go undone. And how can a man from a district that has not had a meeting in two or three years, and who never did anything except collect a few dues or something of the kind, in his own district, act intelligently upon matters that are years ahead of him in other districts and oftentimes national in importance? Another view of the matter is, of course, that the more of the new men we get started in local society management the more we are likely to discover that are worth something for state society management.

I want to make a special appeal to the ex-Presidents of the society, the present council and others who have had experience in society matters to use their influence in getting elected to the different offices of the society men *who can* and *who will* do the work that a society of this kind demands. Do not let the opportunity pass at any election to do your duty in demanding that a man who is elected to one of the offices of the state society should have done a *good deal of good work* in his local society. This is of the greatest importance in the office of Secretary. An inexperienced Secretary, together with a President who has not served as Secretary, will ruin the society in one year. And all the officers of the council will be of even greater importance from now on if you consider favorably the proposition to affiliate with the National Association at our business session on Saturday, and I sincerely hope that you will. Matters that previously have concerned local and state societies will now necessitate taking the national into consideration. Along with affiliation with the national will be created four or five or six new offices, which should be filled with the greatest of care for the next few years. There are some things that the first few Houses of Delegates will have to decide that are of the greatest importance to the future National Association. On some of these matters there is the greatest diversity of opinion, and it is of the most importance that our present representative in the national matters, Dr. G. C. Bowles, be sent as one of our first delegates, and next in importance that the remaining delegates be men who know something of this difference of opinion and are experienced in fighting for things that they believe to be right.

There is another matter which should have attention at this meeting, viz: that of making a contribution to the Foreign Miller Memorial. Two years ago at our annual meeting in this city a contribution of $300.00 to the American Miller Memorial was made. At that time the demand for one to the foreign fund was being urged. Since that time almost every state society has made a generous contribution and the matter has been practically closed so far as America is concerned. Dr. Brophy has us in mind yet, however, and is expecting $500.00 from Michigan, of which amount Dr. Hoff has raised by subscription $250.00, and is asking of the state society to keep its pledge of two years ago, when the joint requests from the workers for both funds was divided and one granted, with the understanding that a contribution to the other would be made at some future time, when the Society's treasury would permit it. I heartily recommend that at our business session on Saturday a recommendation by the Society to the council to grant $250.00 to this fund will be made if in the opinion of the council the treasury will permit it after the expenses of this meeting are paid.

There are several other things that I should like to comment on at this time, but as I have already taken up so many I fear you will think I am burdening you with suggestions, so will leave them to be met by those in charge of the Society's affairs at the time that they come before you for action, and close with the wish that the Presidents who succeed me will be favored with as loyal a council and membership generally as I have had.

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## LETTER FROM DR. L. P. HASKELL

DEAR DR. BETHEL:

I am trying to keep tab on the remnants of the "Old Guard." I notice in THE SUMMARY the marriage of Dr. Horton B. Peck, who has been in practice 62 years.

Recently I had a letter from Dr. W. P. Horton, Cleveland, who is 89 and still in practice. Singular coincidence in names.

I am 86 and in practice 68 years and still at it. In perfect health, in fact, so far as feelings go, am in the "prime of life."

Last summer a dentist died in Maine, my native State, four years older than I, but commenced practice the same year and was doing some work still in the town where he was born and had always lived. His name was Chapman.

Fraternally,

Chicago, Ill. L. P. HASKELL.

# PRESIDENT'S ADDRESS*

BY W. H. MOSELEY, SOUTH BOSTON, VA.

BY A time-honored custom, the presiding officer of this society is expected to afflict you with an address; this is my apology for such an attempt.

For the honor shown by you in your selection of me as your president and for the privilege of even feebly serving you in such capacity and the pleasure the same has brought with it, I can find but feeble words to thank you, but my gratitude and appreciation are deeply felt, if but poorly expressed.

As your presiding officer, permit me to extend to you a most hearty and cordial welcome to these three days of post-graduate study in dentistry. I sincerely trust that our coming together may prove harmonious, instructive and enjoyable to all.

I believe that your presence will amply repay you, for I know this is to be the greatest meeting in the history of our organization. Too much praise cannot be given to the various committees for their work, which will contribute so largely to the success of this meeting and I cannot find words in which to sufficiently express to them my feeling of gratitude for their ever-willing and earnest co-operation.

This association should be dear to the heart of every dentist in the state, and I wish that there was something that I could do or say to you to impress it more upon your minds and hearts. It is the great fountain-head from which emanates everything that is good in our profession, and it has been the greatest factor in bringing our profession up to its present standard. The society embodies all that is best in the profession, it crystallizes and formulates what is in the professional mind, it largely contributes to the fraternal intercourse and good fellowship of its members, the interchange of ideas through papers, discussions and clinics, increases our knowledge and is a well recognized avenue through which the standard of our progress is placed on a higher plane, and brought to the notice, not only of the members themselves, but of the world at large.

Here it is that men of brains and genius professionally show their light, and what is their knowledge belongs to all of its members. Thus it may be seen how important it is for us to do all we can to maintain our association. It is a fact to be lamented that far too many dentists appear to regard society affiliation and attendance as tiresome, troublesome and unnecessary expenditure of time and money for which there is no adequate return. Thus many play the role of stragglers in the army of professional progress, satisfied to let others make pathways easy for their feet, and glad to reap where others have sown. If all reputable dentists were enrolled in the state and national organizations, and active and zealous in their support, both their moral force and financial resources would be vastly augmented.

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*Read before the Virginia State Dental Society, 1912.

I shall take no time to rehearse the old, old story of how our work was first performed by the blacksmiths and the barbers, nor how the acme of professional ambition was reached when small cavities were filled, when the tooth with the exposed nerve was condemned to destruction, and when the carving of plates from ivory was the perfection of mechanical dentistry. This is well known to us all. But in passing this by as trite, it is by no means proper to pass the men of that period by with small mention if we would learn properly the idea of professional life.

Bitter were the prejudices and long were the struggles in the early days before the advent of the noble men into dentistry who appreciated the fact that dentistry depended primarily upon knowledge and skill, instead of skill only. Appreciating this they could not but take hold of the logical conclusion of this appreciation, i. e., that the knowledge of all was greater than the knowledge of any one. Prejudice, bitter though it was, and struggles, prolonged as they may have been, could not withstand the forces of knowledge and the duty of social service, and as a result, we see men meeting on this common ground and realizing a common end.

What else could be produced by men in the same walk in life, imbued with the same ambitions, than the forming of societies for their mutual benefit?

Associations of men with a common aim crystallize their beliefs and hopes in some formulated manner. This formula is best adapted to the conditions in which the association is to labor. But the time comes when the conditions change, and then the formula must be changed or relegated to make way for something more in accord with changed conditions. Too often it is that formulas are retained so long as to bring about a destruction of the association. Creeds and constitutions, true though they may have been, will some day be lifeless forms. As men change the institutions and creeds must change. Institutions were made for man, and not man for institutions. Now in the 20th century, we find conditions markedly different from those in which the first dental societies had their beginning.

The time is coming fast, aye, is already here, when the term "profession" carries a new idea and a larger meaning, which is "duty."

More and more is the professional man looked upon as one speaking with authority, and that authority must be unquestioned.

One of our great missions is to teach, and in proportion as we can bring a message of help and cheer to humanity will our calling be dignified. It is useless longer to delay the time when we shall step forward and deliver the message that humanity is straining its ears to hear. This message must be that a large part of dental misery and mutilation is unnecessary and preventable, and we must show how its prevention is to be brought about.

In proportion as we engraft our professional-selves, work with disinterested motives, and contribute to the public weal, in just such proportion will we rise in the estimation of the people in professional worth. And as the public is informed of how conditions and diseases can be prevented and cured, in an increasing ratio will the services of the dentist be appreciated and demanded. With the increase in demand there will be a stimulus to greater and finer skill in treating the conditions. As skill improves, the conditions, the status of the dental profession, will rise in dignity, not because of any inflated professional conceit, but because of its beneficent importance in relation to health being truly appreciated.

Society as a whole, like its individual members, is ruled chiefly by selfish considerations and pays the highest reward for that which it values most; hence, if we would advance our status as dentists, we must educate the public to a more enlightened interest in the preservation of the dental organs and a fuller realization of their importance to comfort, health and beauty. Few, if any, realize that dental caries as a disease is often an expression or a result of constitutional disturbance, that through the intricate nervous connection between the teeth and distant organs many of the apparent disorders which baffle the skill of learned medical men, could be avoided by early and intelligent attention to the dental organs. If the public health is the most valuable asset of a nation, it follows that the need of educating the public in matters pertaining to oral and dental hygiene is at once apparent. The citizens of the nation are the foundation stones of its wealth and prosperity. All our wealth, our commerce, our industries, are due to the labors of the people. If our citizens continue to grow mentally, morally, and materially, the nation increases in world importance. But the citizens of a nation cannot advance mentally, morally, and materially unless they also advance physically. That is axiomatic and incontrovertible. Rome declined mentally, morally, and politically as her citizenry declined physically. Right living and due regard for health rules must ever be the basis on which the physical welfare of the people depend, and without healthy bodies we cannot expect to find the sound mind.

It is the duty of the dentist to stand guard at the portals of life and see to it that the mouth and teeth are kept in a healthy condition. To not only cure disease, but by service and teaching to prevent disease; to educate the blessed children in the care of their teeth and health.

Does it not seem passing strange, almost unbelievable, that in enlightened America, a country whose loudest if not its proudest boast is its up-to-dateness, in this country of all countries, a citizen of which might almost as well be dead as to be behind the times; in America that leads the world in material, mental and ethical advancement, less than ten per cent of the people ever make the slightest attempt, even, to care for and preserve their teeth, by far the most important of all the bodily conserving organs. No very deep thinking is necessary to arrive at the conclusion that somebody is to blame for this deplorable condition, that there is neglect of duty somewhere, that some class in the community is not living up to its opportunity. And to whom can this charge be attached if not to the dentist? He alone knows the importance of the subject, he alone is fully aware of the far-reaching consequences following the neglect of the teeth, and he alone of all men has the necessary knowledge born of experience in the affairs of his daily life, to teach the people and to enforce his teachings with hundreds of horrible examples. To whom are the ninety millions of American people to look for instruction, for enlightenment, for knowledge in every department of science if not to practical experts, to specialists, in each particular line? It is in keeping with the high estimate of our calling to do something to educate the general public along these lines. Are we not neglecting, and have we not ignored many opportunities, the fulfillment of which would have strengthened our claim upon the public esteem?

With these facts before you, I feel justified in making an appeal to you as an organization to look at this question seriously and see if you can't put on foot some organized movement having for its object the benefit of the civic health, civic sanitation, civic hygiene and civic enlightenment.

* * * *

It seems to me that it is the duty of this society to start a fund for the assistance of our old and indigent members, for those that have been members for at least ten years and have become incapacitated for work, and are in need of help. This is a worthy cause and one that should be at least seriously considered by every state dental society. There is nothing more noble than to help a brother in distress. I, therefore, recommend to the society the appointment of a committee to look into the matter and report at our next meeting.

* * * *

Some two years ago the Ohio state society inaugurated a move to raise approximately eight thousand dollars for the purpose of erecting a suitable memorial in honor of the late Dr. W. D. Miller. I understand that less than one-half of this amount has been paid in, and as it is not deemed advisable to take steps to erect the memorial until the full amount has been secured, I recommend to this society to see to it that our balance of $50.00 is paid in as soon as the financial condition of the treasury will allow, as it is a matter of honor for every member of the profession, collectively and individually, to help in this laudable undertaking, since we have benefited from the scientific research work of Dr. Miller.

* * * *

This association is largely responsible for the high standard of dentistry in this state at the present time, and through its efforts legislation has been enacted requiring the dental student to take the medical degree. By such action I believe that we have taken the greatest step forward for the advancement of our profession that has ever been taken. But we do not desire that Virginia should stand alone in this matter but should begin at once to carry the good work into other states, for so long as we stand alone in the matter it will be harder to maintain our present high standard. This society should appoint some one or two competent men to attend other state societies and read papers before them and endeavor to interest them in doing what we have done as we need their co-operation in this most important undertaking. This can be done with but little cost and is worthy of our most earnest efforts, and I recommend that this society take some action in the matter during the present session.

* * * *

A word about our membership. We have not the membership in the society that we should have. I do not believe that we have two-thirds of the dentists of the state. We ought to have all of them and when the proper efforts are made to secure them we will get them. Many of the younger men have been taxed to the extent of their financial ability in getting their education, and they do not feel like paying the money necessary to join a society. I would recommend that we make a difference in favor of the new member, and make the fee nominal so they can afford to join. We need them and they need us. If we get hold of them in time we can influence them and aid them and have them as a part of ourselves.

* * * *

A very important branch of our instructions seems to be sadly lacking in our colleges of to-day, and that is the teaching of dental ethics. Many a man has graduated and gone out to practice without ever having heard a lecture on this subject. It is no wonder that quite a considerable number of our young men stimulated by the desire to push themselves to the front and win fame and fortune, and often in order to combat some one else who is practicing advertising or resorting to some other scheme to win public favor, are thus decoyed into doing something that they would not have done had they been warned about it while at college.

It is a generally admitted fact that we are selfish beings, envious or covetous, not alone in matters of social life but in all modes and manners of occupations, trades and professions, not only to gain the necessities of life but abundance above each other. To be ethical, however, is not to practice the rules of ethical deportment so much in what you *do* as what you *are*. It is ethical philosophy when we study laws and reasons that should prompt our actions towards society. It is ethical sentiment when we do unto others as we would have them to do unto us. If the philosophy of the rules of ethics were more diffused among the institutions of dental education and our society laid more stress on it, it would surely be conducive to more congeniality and good fellowship and refining influences of an elevating character than are now manifest among us. It appears to me that there should be some requirements of this kind by our board of dental examiners from the men who are constantly coming into this state to practice. They can at least be asked if they will conduct themselves in conformity to the prescribed rules of ethics as laid down by our dental society. I, therefore, recommend to the members of this society to legislate some means for amending and revising our meagre code of dental ethics to be in consonant keeping with the vast increase in our ranks and consequent demand for the protection of the dental practice and professional character in the state.

* * * *

The grim reaper, Death, has removed from us two of our most honored and valuable members: Dr. J. T. Thompson and Dr. Frank L. Harris. We shall miss them from the meeting as they were both valuable members and did much for the association. Dr. Thompson was the first president and to him is largely due the credit for much good and honorable service in organizing our society. I have delegated one far better qualified than myself to tell you more about his life and work, one who worked with him, side by side, a good deal of the time and speaks from an intimate knowledge of what he did.

I recommend to the society the appointment of a committee to draft suitable resolutions of respect on the death of these two worthy members.

* * * *

In conclusion I wish again to thank all committees and officers for efficient co-operation in the work of the year. We feel a justifiable pride in the program, which is now in your hands.

It has been our ambition that this meeting should mark an era in the life of this association, and this will be accomplished if the suggestions which we make to you are carried out in the same spirit of enthusiasm for greater efficiency with which they are offered.

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# THE OCCLUSION OF THE TEETH.

BY MARTIN DEWEY, KANSAS CITY, MO.

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THE OCCLUSION of the teeth is the relation of the incline plane of the teeth. The term articulation should never be used in describing the relation of the teeth of one arch to the teeth of the other arch (1, 2). There is no need of having a different term to denote the relations of the teeth when the jaws are at rest and when the mandible is making the usual excursions during mastication. We find that there is a definite and positive relation of the teeth of one arch to those of the other and that a definite relation exists when the jaws are closed and also during mastication,

The dental apparatus is made up of a number of teeth, the teeth of each arch bearing a certain relation to the teeth of the opposing arch. Each tooth also bears a relation to the line of occlusion (3), which is defined as "that line with which in form and position the teeth must be in harmony if in normal occlusion." Forces of occlusion are those factors which cause teeth to assume and maintain a proper position in the line of occlusion. Of these forces there are six that can be recognized at the present time, all of which are important and must be present if the teeth are to remain in normal occlusion. The loss of any one of these forces will result in the teeth drifting from the line of occlusion, and malocclusion will result. These forces of occlusion are normal cell metabolism, muscular pressure, atmospheric pressure, harmony in the size of the arches, approximal contact and the force of the incline plane. I have tried to name these forces of occlusion in the order of their appearance during the development of the dental arch.

By normal cell metabolism is meant that activity of cells or physiological activity (1) which causes teeth to erupt, the root to form and the alveolar process and peridental membrane to develop with the teeth. After the tooth has erupted, the tissues which support it must remain in a healthy condition or the tooth will not maintain its proper position in the line of occlusion.

Cell metabolism is the first force which plays any part in causing the teeth to assume a position in the line of occlusion and is also of the most important in maintaining them there. I am aware of the fact that some of the other forces acting as mechanical stimulating influences (4) play a part in causing the cells to do their work, yet it is a force that must be considered.

*Muscular Pressure.*—Even before the teeth appear through the gums the pressure of the muscles play an important part in causing them to erupt in a certain position. Not only do the teeth exert an influence upon the teeth themselves, but the bone which supports them is capable of being molded by the muscles as is bone in other parts of the body (5). After the teeth emerge from the gums then the action of the muscles of the cheeks and the tongue play an active part in causing them to assume a certain position in the arch. The action of the muscles during mouth breathing (6) is well known to those who have practiced orthodontia and read the dental literature of late.

*Atmospheric Pressure.*—Having mentioned the deformities which occur as a result of mouth breathing and having called your attention to the fact that muscular pressure was responsible for some of the change because of the abnormal forces which are brought to bear upon the teeth, I must call your attention to the fact that all of the deformity is not due to abnormal muscular action. In normal breathing the lips are closed and the mandible is held in position by atmospheric pressure. The tongue occupies the whole of the oral cavity, with the exception of a small vacuum which exists between the median upper portion of the tongue and the middle of the hard palate. It is this vacuum that holds the mandibles in position and keeps the muscles of the mandible and hyoid in their normal position. A constant pressure is exerted upon the hard palate and all of the soft tissues are held in their normal positions against the teeth, thereby maintaining the teeth in their proper position.

*Harmony in the Size of the Arches.*—The teeth of the upper and lower arches are so shaped that there is a balance in the size of the two arches when all of the teeth are present. Should there be more teeth in one arch than in the other, teeth of unequal size, normal occlusion would be impossible.

*Force of the Approximal Contact.*—The importance of the proximal contact of teeth has long been recognized (7) but little attention has been paid to it as a force of occlusion, which it is. In a paper published (8) a few years ago I called attention to the approximal contact point as a factor in the evolution of the teeth and jaws. When the teeth are erupting, the proximal contact guides them into their position until such a time as the force of the incline planes—slopes of the cusps—become active. After the teeth are in the proper position the approximal contacts are very active in maintaining them there. I have illustrated this force by comparing it to three balls laid in a line. Force can be applied to the end balls by pushing them together and all will stay in a line, but if the center ball is out of line the least bit it will roll away from the other two balls. A great mistake had been made in time past by the use of a large number of bands upon the teeth during the regulation of the teeth, which caused spaces to exist between the teeth and thereby destroying the approximal contact. When the bands are removed the teeth drift until they reach some other tooth, often starting a case of malocclusion in what would have otherwise been a normal occlusion.

*Force of the Incline Plane.*—By the force of the incline plane is meant the action which is exerted by the slope of the cusps of one tooth upon some other tooth: Each cusp possesses a certain number of incline planes. These incline planes are also called occlusal inclines or occlusal incline planes. The incline planes are bounded by ridges and grooves (9). They are named from the directions which they face, taking their names from the sides of the teeth, viz.: mesial, distal, buccal and lingual. Owing to the arrangement of the teeth, the upper teeth being in a larger arch than the lower, the buccal surfaces of the upper teeth extend over the lower, and owing to the increased width of the upper incisors over the lower incisors, the lower teeth are mesial one cusp to the uppers. This brings a mesial surface of a tooth in one arch against a distal surface of a tooth in the lower arch. Also, a buccal incline always occludes with a lingual incline. However, owing to the buccal position of the upper molars and premolars and to the mesial position of the lower molars and premolars, we are forced to make use of compound terms to describe the occlusion of the teeth, viz., mesio-buccal, mesio-lingual, disto-buccal and disto-lingual.

There are certain points, certain teeth which are taken as more fixed points than others. There are certain cusps which bear a relation to other cusps and can be remembered as fixed points for diagnosis. The mesio-buccal cusp (3) of the upper first molar occupies a position in the buccal groove of the lower first molar. A more important cusp, from the point of mastication, is the mesio-lingual cusp of the upper first molar which occupied a position in the central fossa of the lower first molar and is surrounded by the five cusps of the lower first molar. However, for the convenience of description, the disto-buccal cusp and the distal cusp of the lower first molar is given as one cusp. I will mention the occlusion of the distal cusp at a later period. The mesio-buccal cusp of the lower first molar occupies a position between the distal cusps of the upper first premolar and the mesial cusps of the upper first molar. The disto-buccal cusp of the lower first molar is received in the central fossa of the upper molar, and therefore surrounded by four cusps. The upper canine occludes on the buccal of the lower canine and the lower first premolar.

The occlusion of the incline planes of the upper and lower teeth is as follows and is given here, as I know of no place where it is published[*].

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NOTE: The incline planes of the upper teeth are given in the left hand column and the incline planes of the lower, with which they occlude, are shown in the right hand column. If you desire to find the occlusion of any incline plane of a lower tooth, it can be learned by finding the incline plane of the cusp and tooth desired in the right hand column and occluding it with the incline plane, cusp and tooth opposite it in the right hand column.

| UPPER TEETH | | LOWER TEETH |
|---|---|---|
| The occlusal lingual third of the upper first incisor.......... | occludes with | the labial occlusal third of the lower first incisor and the mesio-labial half of the occlusal surface of the lower second incisor. |
| The occlusal lingual third of the upper second incisor..... | occludes with | the disto-labial occlusal surface of the lower second incisor and the mesio-labial incline of the lower canine. |
| The mesio-lingual incline plane of the upper canine......... | occludes with | the disto-buccal incline plane of the lower canine. |
| The disto-lingual incline plane of the upper canine......... | occludes with | the mesio-buccal incline plane of the buccal cusp of the lower first premolar. |
| The mesio-lingual incline plane of the buccal cusp of the upper first premolar.......... | occludes with | the disto-buccal incline plane of the buccal cusp of the lower first premolar. |
| The disto-lingual incline plane of the buccal cusp of the upper first premolar........... | occludes with | the mesio-buccal incline of the buccal cusp of the lower second premolar. |
| The mesio-buccal incline plane of the lingual cusp of the upper first premolar.......... | occludes with | the disto-lingual incline plane of the buccal cusp of the lower first premolar. |
| The mesio-lingual incline plane of the lingual cusp of the upper first premolar........... | occludes with | the mesio-buccal incline plane of the lingual cusp of the lower first premolar. (This cusp is often underdeveloped.) |
| The disto-buccal incline plane of the lingual cusp of the upper first premolar.......... | occludes with | The mesio-lingual incline plane of the buccal cusp of the lower second premolar. |
| The disto-lingual incline plane of the lingual cusp of the upper first premolar.......... | occludes with | the mesio-buccal incline plane of the lingual cusp of the lower second premolar. |
| The mesio-lingual incline plane of the buccal cusp of the upper second premolar........ | occludes with | the disto-buccal incline plane of the buccal cusp of the lower second premolar. |
| The disto-lingual incline plane of the buccal cusp of the upper second premolar........ | occludes with | the mesio-buccal incline plane of the mesio-buccal cusp of the lower first molar. |
| The mesio-buccal incline plane of the lingual cusp of the upper second premolar........ | occludes with | the disto-lingual incline plane of the buccal cusp of the lower second premolar. |

| UPPER TEETH | | LOWER TEETH |
|---|---|---|
| The mesio-lingual incline plane of the lingual cusp of the upper second premolar........ | occludes with | the disto-buccal incline plane of the lingual cusp of the lower second premolar. |
| The disto-buccal incline plane of the lingual cusp of the upper second premolar........ | occludes with | the mesio-lingual incline plane of the mesio-buccal cusp of the lower first molar. |
| The disto-lingual incline plane of the lingual cusp of the upper second premolar........ | occludes with | the mesio-buccal incline plane of the mesio-lingual cusp of the lower first molar. |
| The mesio-lingual incline plane of the mesio-buccal cusp of the upper first molar........ | occludes with | the disto-buccal incline plane of the mesio-buccal cusp of the lower first molar. |
| The disto-lingual incline plane of the mesio-buccal cusp of the upper first molar........ | occludes with | the mesio-buccal incline plane of the disto-buccal cusp of the lower first molar. |
| The mesio-buccal incline plane of the mesio-lingual cusp of the upper first molar........ | occludes with | the disto-lingual incline plane of the mesio-buccal cusp of the lower first molar. |
| The mesio-lingual incline plane of the mesio-lingual cusp of the upper first molar........ | occludes with | the disto-buccal incline plane of the mesio-lingual cusp of the lower first molar. |
| The disto-buccal incline plane of the mesio-lingual cusp of the upper first molar........ | occludes with | the mesio-lingual incline plane of disto-buccal cusp of the lower first molar. |
| The disto-lingual incline plane of the mesio-lingual cusp of the upper first molar........ | occludes with | the mesio-buccal incline plane of disto-lingual cusp of the lower first molar. |
| The mesio-lingual incline plane of the disto-buccal cusp of the upper first molar........ | occludes with | the disto-buccal incline plane of the disto-buccal cusp of the lower first molar. |
| The disto-lingual incline plane of the disto-buccal cusp of the upper first molar........ | occludes with | the mesio-buccal incline plane of the mesio-buccal cusp of the lower second molar. |
| The mesio-buccal incline plane of the disto-lingual cusp of the upper first molar........ | occludes with | the disto-lingual incline plane of the disto-buccal cusp of the lower first molar. |
| The mesio-lingual incline plane of the disto-lingual cusp of the upper first molar........ | occludes with | the disto-buccal incline plane of the disto-lingual cusp of the lower first molar. |
| The disto-buccal incline plane of the disto-lingual cusp of the upper first molar........ | occludes with | the mesio-lingual incline plane of the mesio-buccal cusp of the lower second molar. |
| The disto-lingual incline plane of the disto-lingual cusp of the upper first molar........ | occludes with | the mesio buccal incline plane of the mesio-lingual cusp of the lower second molar. |
| The mesio-lingual incline plane of the mesio-buccal cusp of the upper second molar..... | occludes with | the disto-buccal incline plane of the mesio-buccal cusp of the lower second molar. |
| The disto-lingual incline plane of the mesio-buccal cusp of the upper second molar...... | occludes with | the mesio-buccal incline plane of the disto-buccal cusp of the lower second molar. |
| The mesio-buccal incline plane of the mesio-lingual cusp of the upper second molar...... | occludes with | the disto-lingual incline plane of the mesio-buccal cusp of the lower second molar. |
| The mesio-lingual incline plane of the mesio-lingual cusp of the upper second molar...... | occludes with | the disto-buccal incline plane of the mesio-lingual cusp of the lower second molar. |
| The disto-buccal incline plane of the mesio-lingual cusp of the upper second molar..... | occludes with | the mesio-lingual incline plane of the disto-buccal cusp of the lower second molar. |

| UPPER TEETH | | LOWER TEETH |
|---|---|---|
| The disto-lingual lincline plane of the mesio-lingual cusp of the upper second molar..... | occludes with | the mesio-buccal incline plane of the disto-lingual cusp of the lower second molar. |
| The mesio-lingual incline plane of the disto-buccal cusp of the upper second molar...... | occludes with | the disto-buccal incline plane of the disto-buccal cusp of the lower second molar. |
| The disto-lingual incline plane of the disto-buccal cusp of the upper second molar..... | occludes with | the mesio-buccal incline plane of the mesio-buccal cusp of the lower third molar. |
| The mesio-buccal incline plane of the disto-lingual cusp of the upper second molar...... | occludes with | the disto-lingual incline plane of the disto-buccal cusp of the lower second molar. |
| The mesio-lingual incline plane of the disto-lingual cusp of the upper second molar..... | occludes with | the disto-buccal incline plane of the disto-lingual cusp of the lower second molar. |
| The disto-buccal incline plane of the disto-lingual cusp of the upper second molar..... | occludes with | the mesio-lingual incline plane of the mesio-buccal cusp of the lower third molar. |
| The disto-lingual incline plane of the disto-lingual cusp of the upper second molar...... | occludes with | the mesio-buccal incline plane of the mesio-lingual cusp of the lower third molar. |
| THIRD MOLAR<br>The mesio-lingual incline plane of the mesio-buccal cusp of the upper third molar....... | occludes with | the disto-buccal incline plane of the mesio-buccal cusp of the lower third molar. |
| The disto-lingual incline plane of the mesio-buccal cusp of the upper third molar...... | occludes with | the mesio-buccal incline plane of the disto-buccal cusp of the lower third molar. |
| The mesio-buccal incline plane of the mesio-lingual cusp of the upper third molar...... | occludes with | the disto-lingual incline plane of the mesio-buccal cusp of the lower third molar. |
| The mesio-lingual incline plane of the mesio-lingual cusp of the upper third molar....... | occludes with | the disto-buccal incline plane of the mesio-lingual cusp of the lower third molar. |
| The disto-buccal incline plane of the mesio-lingual cusp of the upper third molar....... | occludes with | the mesio lingual incline plane of the disto-buccal cusp of the lower third molar. |
| The disto-lingual incline plane of the mesio-lingual cusp of the upper third molar...... | occludes with | the mesio-buccal incline plane of the disto-lingual cusp of the lower third molar. |
| The mesio-lingual incline plane of the disto-buccal cusp of the upper third molar...... | occludes with | the disto-buccal incline plane of the disto-buccal cusp of the lower third molar. |
| The disto-lingual incline plane of the disto-buccal cusp of the upper third molar..... | occludes with | nothing. |
| The mesio-buccal incline plane of the disto-lingual cusp of the upper third molar....... | occludes with | the disto-lingual incline plane of the disto-buccal cusp of the lower third molar. |
| The mesio-lingual incline plane of the disto-lingual cusp of the upper third molar....... | occludes with | the disto-buccal incline plane of the disto-lingual cusp of the lower third molar. |
| The disto-buccal incline plane of the disto-lingual cusp of the upper third molar....... | occludes with | nothing. |
| The disto-lingual incline plane of the disto-lingual cusp of the upper third molar...... | occludes with | nothing. |

All of the teeth of the upper and lower arch occlude with two teeth of the opposing arch with the exception of the lower central incisor and the upper third molar. The mesio-lingual incline on the disto-buccal cusp of the upper third molar is the only incline plane of that cusp which has occlusion. The remaining inclines do not occlude with anything. The mesial incline planes of the disto-lingual cusp of the upper third molar has occlusion with the distal cusps of the lower third molar, but the distal inclines of the disto-lingual cusp of the upper third molar does not occlude with anything.

The labial surfaces of the upper incisors and canines and the buccal incline planes of the buccal cusps of the upper molars and premolars do not occlude with any teeth. They are in contact with the lips and cheeks.

The lingual surfaces of the lower incisors and canines and the lingual incline planes of the lingual cusps of the lower molars and premolars do not occlude with any teeth but are in contact with the tongue.

The lingual cusp of the lower first premolar is often very small, but when large enough to reach the upper teeth has occlusion only on the disto-buccal side.

The lower first molar is a five-cusp tooth, having three cusps on the buccal side, named: mesio-buccal, disto-buccal and distal. The distal cusp occupies a position distal to and between the disto-buccal and disto-lingual cusp. In giving the occlusion of the incline planes the distal cusp and the disto-buccal cusp are considered as one cusp. This is convenient but not exactly correct. If we examine a skull with normal occlusion, or a set of models made from normal first molars, we will find that the distal cusp of the lower first molar occludes between the disto-lingual ridge and the buccal surface of the disto-lingual cusp of the upper first molar. When the mandible is moved laterally the distal cusp of the lower first molar occludes with the distal surface of the disto-buccal cusp of the upper first molar. This position is made possible because of the greater width of the buccal surface of the lower first molar over the buccal width of the upper first molar.

In a great many mouths we find that the lower second premolar (9) is a three-cusp tooth, possessing a mesio- and disto-lingual cusp; in which cases the tip of the lingual cusp occludes between the two lingual cusps and the disto-lingual surface of the lingual cusp of the upper premolar occludes with the disto-lingual cusp of the lower second premolar and the mesio-lingual cusp of the lower first molar. This increases the masticating efficiency of the teeth.

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1016 East Armour Blvd.

# PRESIDENT'S ADDRESS*

### BY W. J. BOYDSTON, FAIRMONT, W. VA.

IT IS NOT as easy to prepare an address as it is to talk about preparing one. It is not a lack of subjects to write upon, but the selection of one that is of interest to all.

This beautiful mountain resort, with its lofty mountain peaks and beautiful scenery, is in itself enough to inspire the poets; but not being a poet I will confine my remarks to a brief outline of our society; what has been done and what we expect to accomplish.

About thirteen or fourteen years ago there was in existence a West Virginia State Dental Society, but from some unknown cause it was allowed to die, and the dentists of our fair State were without this very great necessity. Therefore, we were held up to ridicule by other States for our unprogressiveness.

This at last became unbearable, and in 1907 a movement was started by our esteemed Secretary, Dr. Wright, and a few other progressive men, to organize a State society. The request was sent out to all professional men interested to meet in Clarksburg, at the Waldo Hotel, May 14 and 15, 1907. There were thirty-three men responded to this call, and with these as charter members the foundation for a West Virginia State Dental Society was laid. With the assistance of the experienced Dr. Libbey, of Pittsburg, we were directed as to the proper method to pursue in order to form a permanent organization.

Our first regular meeting was held in Parkersburg, at the Chancelor Hotel, October 9, 10 and 11, 1907, with Dr. H. H. Harrison as our first President. At this meeting our constitution, by-laws and code of ethics were adopted. At this, our first meeting, we began to grow, receiving twenty-three new members. At the conclusion of this meeting Dr. Monroe, of Parkersburg, presented this society with this valuable instrument, a turnkey, which we found more suitable for a gavel than the penknife used.

Our second meeting was held in Fairmont the second Wednesday in October, 1908, with our late Dr. C. H. Bartlett as President. Excellent papers and clinics were given, and the foundation for better dental legislation was laid.

The third meeting, and a most excellent one, was held in Wheeling at the Stratford Hotel, October, 1909, with Dr. J. E. Dowden, Sr., as President. At this meeting the subject of oral hygiene and public education was discussed, and resulted in the dentists of Wheeling securing Dr. Hunt to give a public lecture, which was one of great interest and largely attended. We also selected THE DENTAL SUMMARY as our official organ. The question of our society becoming a member of the National Association was discussed, but no action was taken; a number of our members signified their intention of attending the national meeting at Cleveland, and I am glad to say that the West Virginia dentists gave good account of themselves. It was a proud minute for me when I was informed that every man who had promised a clinic from West Virginia was "there with the goods." I wish to say just here that if you have never attended a National Association meeting, by all means go to Washington in September. Don't miss it; for I assure you it is an opportunity of a lifetime, not only as a liberal education, but from a social standpoint. You will come home with a greater love for your profession and brother dentists than you ever had. We also discussed the advisability of changing the time of meeting of our society from October to August, and a motion was received to that effect and laid over for one year.

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*Remarks before the West Virginia State Dental Society, 1912.

Our fourth meeting was held in Parkersburg, at the Chancelor Hotel, with Dr. J. H. McClure as President. The time of meeting was changed to the second Wednesday in August. By this we hope to get more men from the different colleges, as this time would not interfere with their school work, and also get more of our own members, as this is a good way to start your vacation. We were very sorry that one of our most prominent members, Dr. Bartlett, was unable to be with us on account of the serious illness of his good wife, and that he never had the opportunity of again meeting with us. Representatives were sent to our Legislature to look after a bill regulating the practice of dentistry that was presented.

Our fifth meeting was held in Clarksburg, at the Waldo Hotel, August, 1911, with Dr. L. J. Walker as President. Our representatives reported that the bill passed by the Legislature was not a good one, and a movement to prevent it becoming a law was started, and, I am glad to say, succeeded. We also found we were not legally organized by reason of not having a charter. Necessary steps were taken, a charter and seal secured, and an organization meeting held. So we are now legally right.

Our society has grown from thirty-three charter members to one hundred and twenty-six active and seventeen honorary members, but still has not made the progress that it should. We have in West Virginia five hundred and eighty-five licensed dentists, and every ethical dentist of that number should be an active member of this society, and we hope the time will soon arrive when they will all join us. We need them, and they need us.

The oral hygiene movement has made progress in our State. We now have medical inspection in our public schools, and we hope to include dental inspection before long. The medical inspection in the Fairmont public schools has been of great benefit.

It is our purpose to frame a bill that will protect our State from empiricism, and put us on an equal basis with other States. To do this we must all work together; interest our Senators and Representatives, and other political friends, and secure, if possible, their support of such a bill. The only way we can accomplish this is to enlarge our society that we may have something back of such a movement; for it is necessary that we represent a truly representative body, so that when we approach our political friends in behalf of this bill and they say to us, "Whom do you represent?" we can say, "The West Virginia State Dental Society." And if they should say unto us, "Who are they?" we will be able to say unto them, "All the ethical dentists in West Virginia." Then we will be able to get results, and not until then.

*The Oral Hygiene*, published by Lee S. Smith & Son, is now agitating the movement relative to dental inspection by insurance and railroad companies, and these companies are seriously considering such a movement, fully realizing the benefit to be derived therefrom.

In regard to our society affiliating with the National Dental Association in their reorganization along the lines of the American Medical Association. I trust this society will discuss this question thoroughly, and adopt resolutions pledging its support to this movement, as I think it a good one, and one that we should be interested in.

I have briefly stated a few facts, and we now have for your consideration a number of excellent papers and clinics that will be of interest to all.

I want to thank our committees for their excellent work, and especially our program and arrangement committees for the excellent arrangements that have been made for our entertainment and benefit, and when the reports are made by the chairmen of the various committees you will agree with me that they have performed their work well.

# ORTHODONTIA AS REGARDED BY THE AVERAGE PRACTITIONER*

BY W. E. WHITT, D. D. S., ABINGDON, VA.

ORTHODONTIA is one of the most important branches of our great profession, and in my mind is one of the most neglected. Let us study for a moment the reason for this state of affairs. There are several. One is that the average dentist is not paid a fee sufficient to justify him in treating the case. Why not? Because orthodontia is practically in its infancy and not very well understood by the average patient, many parents not realizing the importance of having their children's teeth straightened, possibly some in the country and small towns being ignorant of the fact that such a thing can be done.

Patients not educated along this line would feel that a dentist was an extortioner, who would tell them it would cost $50.00 to have their daughter's teeth straightened. Yet those who are well informed on this subject, and know what can be done, are willing to pay a good fee for this class of work, some even to hundreds of dollars. Another difficulty is that many patients living in the country are so situated that it is very inconvenient for them to see the dentist as often as is necessary to properly treat a case, but this objection will usually be overcome if patients can be made to see the great importance, the necessity, of having the teeth straightened. Another important fact is that the average dentist does not know as much as he should about orthodontia, not casting any reflections on the intelligent members of our society, but I think most of you will agree with me on this point. It also is true that many dentists do not properly apply the knowledge and skill they have at their command.

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*Read before the Virginia State Dental Society, 1912.

The average young dentist of today has had some training along this line, as there is no reputable dental college but has taught this branch of dental science for the last five to eight years and many of them for a longer period. It is true that many of our older practitioners did not have this advantage, yet some men who graduated before orthodontia was more than heard of, have gone to work and by study and practical experience have done much along this line.

I am sorry to say that all the average young men of today cares for before he graduates is to know enough about this subject to pass his examination, and get his degree and license to practice; and then he drops it and gives it no more special thought. This is no more right and proper than to drop dental surgery, crown and bridge-work, or even prosthetic dentistry.

One of the great drawbacks in orthodontia is the fact that the average dentist has not the confidence in himself nor the courage to tackle a difficult case, and dreads the thought of treating a case because of the fear that he will not accomplish what he should or as much as the patient expects. Therefore, he hesitates to charge a fee that will justify him for time and services rendered. On account of this one fact the average man will find some excuse and try to put the matter off, possibly telling his clients that it will be best to wait until the child gets older, probably it will be best to wait until all the permanent teeth are erupted and see if they will not eventually come into place themselves and not have to be treated. This is a great mistake, as nine cases in ten will continue to get worse instead of better.

These and many other excuses are resorted to by the man who feels that he cannot properly treat or does not want to be bothered wth treating the case. He will often tell the patient to press the teeth with the thumb and fingers in the direction they should go in order to get them into proper position. This is good and may answer in a very few cases, those which nature would no doubt correct herself without assistance. The average man may treat a simple case where he knows the outcome and that he will be sure to accomplish all that is desired.

The man who knows anything about orthodontia is aware of the fact that nothing is gained by delaying a case, as the inclined planes of the cusps and teeth have a tendency to keeep the teeth in normal occlusion when in proper relation to each other; also, that the reverse is true when out of proper relation, for they have a tendency to cause the teeth to become more irregular. We realize this in treating a case when the point of near normal occlusion is reached, for how readily and easy it is to complete the case, nature almost doing the rest without our assistance.

This brings me to the most serious error made by the average practitioner in the treatment of malocclusion. It is this: the extraction of some of the teeth. Often some of the permanent teeth are extracted, thereby rendering it almost impossible to restore the normal contour and proper facial expression of the patient. I have seen this in several cases where the superior cuspids had been extracted in childhood. I have in mind some cases where teeth have been extracted for young ladies and their beauty marred for life. The dentist that does this, of course, tells the patient that extraction is necessary and the proper thing to do, probably telling them that it has been put off too long. In fact, this custom has been practiced so much by dentists that the average patient now thinks it is proper, and will often ask the dentist to extract some teeth; and often the dentists, without a word or hesitation complies with their request, rather than explain, as he knows very well he should, that the best thing to do is not to extract any of the teeth, but to correct the case and have the teeth straightened by the proper methods.

Too much stress cannot be laid on this common error of extracting to correct a case of malocclusion. I am almost inclined to say it is criminal practice; to say the least, it is malpractice. The man who has not the time or for any reason does not want to treat a case, should, in every instance, try to give his patients his best advice and enlighten them as far as possible along this line, and let his patients know he is looking out for their welfare by explaining in every way possible what it will really mean to them to have their teeth put into normal occlusion; and in most cases he will convince them. Then refer them to some dentist who does such work, and in the long run he will have made better patients and friends of them. Under no circumstances are we justified in extracting to correct malocclusion.

I believe this state of affairs is worse in the small towns and in the country than in the city. Usually in a town or city of any size there are dentists who practice orthodontia, and for this reason the other man will often post himself.

In conclusion, I will say at this advanced and intelligent age it behooves us to get busy so as to be able to render intelligent service along this line, for the best and most intelligent people now know what can be done, and the other man will get ahead of us if we are not progressive.

**Many a man thinks his life is clouded over when the truth is he is burying his head in the steam of his own sighings.**

# EXAMINATION OF SCHOOL CHILDREN*

BY S. B. LANGFITT, D.D.S., PARKERSBURG, W. VA., AND OTHERS.

When this matter was taken up with our local society at home, Dr. Huchinson had intended to prepare the paper; then decided to go on the program for something else, and he asked me to do it, and I told him I would. About that time I went to the Superintendent of Schools, and he was away on his vacation, and it was not possible for me to get the information I desired, so I have no paper.

We did make an examination of the school children in our town, and I can tell you what we accomplished there. We were surprised to find the condition of their teeth. It is alarming. We examined from first to eighth grades, inclusive, and found only fifteen per cent. of the children in those grades had ever had any dental work done. But I am not able to give you the number of children, nor the number of teeth examined, for the reason that Superintendent Bush was away on his vacation before I was requested to get up the paper, and I was not able to get the information; but I think we have started a good work there, and we expect to follow it up again this year and see what progress has been made. We had the permission of the School Board to go into the schools and do the examining. They assisted us, and gave us all the information and assistance they could. We had the assistance of the teachers; they took the matter up and did all the writing for us; we only had to make the examinations. We divided the town up into districts and went by twos; had literature printed before we went there, examination sheets, and the teachers had the names of the pupils, and they called them into the examination rooms in order; we made the examinations, called out work necessary to be marked off, and teachers marked it off. They were very courteous and kind and assisted us all they could, and the Board is working right along with us. We gave each child a slip, showing what condition we had found. We had three slips prepared; the parents got one, the Board of Education got one, and the society got one. (Applause).

Dr. D. C. Clark, Blacksville: I spoke to Dr. Langfitt a day or two ago about his paper. He said there was no paper, but that I might have a discussion. I have nothing to say, except that I have heard a good deal about this inspection in the public schools, by literature, and especially at the National Association last year. It is a mighty good thing. I have not had any experience in doing this myself, but I saw from Dr. Ebersole's class in Cleveland last year that it is a great work. A great impression can be made by this work on the children.

Dr. W. E. H. Caldwell, Wheeling: I haven't anything to say on the subject, but I would like to ask in what manner the dentists in Parkersburg approached the School Board to get this permission to examine the children's teeth. It has been tried in Wheeling, but we have been unable to get the consent of the School Board to make the examination. Whether it is a difference in the personality of the Parkersburg School Board from ours, I do not know, but I would like to have information as to how they were approached, just for the benefit of the organization in Wheeling. We expect to take the matter up again this year, and any information we can gain we will appreciate.

Dr. S. B. Langfitt, Parkersburg: We have a little society there in Parkersburg known as the Wood County Dental Society. The matter was taken up with the Board of Education through the President and Secretary. We had no opposition whatever. They were anxious to co-operate with us. We have a very bright City Superintendent of our schools, I can say that, and he gave us all the assistance he could.

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*Talk before the West Virginia State Dental Society, 1912.

Dr. H. H. Smallridge, Charleston: I would like to ask Dr. Langfitt what material results have the Parkersburg dentists had from that examination. Did they do anything for the poor class of children who needed attention and could not get it, or just examine them and see what they needed, just to get the statistics?

Dr. Langfitt: We only made the examination; have not carried it that far yet. It is surprising, though, to find the results. It is remarkable the number who have come into our offices since this examination was made with our certificates, and told us that they were not aware that those were six-year molars; it is surprising the class of people who do not know this; thought they were deciduous teeth, or that they would come out after a while and they would get new teeth there. The results have been beneficial.

Dr. L. G. Beerbower, Terra Alta: The simple fact that the examination was made and those charts filled out was a great benefit. Those children received something there that was new to them; something they never had before. They carried them home! a great many of them were torn up or thrown away and never were seen by the parents; a great many of them fell into the hands of the parents of the children; they examined them, and nine out of ten, I should say, of those did not know that their child needed attention. When they saw the chart they immediately started the child off to the dentist. They saw this tooth marked relative to the six-year molar and that they should be saved. It taught them something there. They went to the dentist's and insisted on having them filled. You have all heard the remark, when a child comes into the office with its teeth in miserable condition, they didn't know Mary or Johnny had any big teeth. If you get nothing more than that it is worth while. Here is my idea, that you bring it to the attention of the school teacher. We cannot reach the children, nor the public, but unless we have some means to reach them the medium of the public school teacher, who comes in contact with them every day during schools hours, is the most likely source through which we can reach the children, and through them reach the parents; and the time is going to come when we will be in better position regarding dentistry than we are today in reaching the masses of the people.

Dr. W. B. Conaway, Clarksburg: We had an examination of the public schools in Clarksburg last year, and it was really a new thing to me, and I am not yet able to understand the law. Dr. Alterman was appointed to examine the school children, a capable physician, and he had cards in blank form, where he could mark abnormal conditions, adenoids, enlarged tonsils or carious teeth; and he marked those cards and sent them to their physician or dentist; and they were asked to have those abnormal conditions corrected before the card was returned, signed by the physician or dentist, and the card was then sent by the dentist or physician, whoever corrected the abnormal conditions, and returned. They have no way to enforce it, and a great many cards came to the dentists and physicians; something like 100 fell into my hands. I did not work for all of those children. For some I did it for nothing; some I charged the nominal fee, and some the regular fee, where I could find out the condition of their financial circumstances. It did a great deal of good and started a work that I wish the dentists could join in and help to examine the mouths of some children and mark the carious teeth. Some objection was made by some parents and cards thrown aside, and conflicting reports went out about the examination.

President Boydston: I can only say for the Fairmont public schools that the medical examiners are on the dentists' side. They are looking after the work very thoroughly. The physician having this in charge, Dr. Carr, promised me the statistics of what he had done and conditions, etc., but he went on his vacation just before he was to get them for me; had been very busy and didn't get them ready for me. I was very anxious to present them to the society, because I think it would have given something to think about. A great many of these charts have come into my possession and other dentists of the town, and there is no doubt in my mind but that it has started a mighty work. I think eventually the work will progress to such a degree that the dentists will have a place on these examining boards. When that is accomplished I think we will see great results.

Dr. C. H. Chapman, Webster Springs: I have not been practicing in West Virginia long, and I am not prepared to say what West Virginia towns have done. When I practiced in Richmond, Va., I made an examination in one year of 620 children. There a regular school nurse is provided for each ward. The young lady brought the children and I examined them and made my report to her. It was astonishing how many of those children needed attention. We ought to realize what a condition exists among the children. Another thing I noticed—there was no compulsion; we didn't force those children; they had medical inspection in the schools, and this nurse's duty was to turn the report into the school, and as far as possible have the children looked after and bad defects corrected, adenoids, etc. I was surprised at the interest the parents took. Dr. Beerbower has told us a great deal. Some seed falls on ground that isn't good and doesn't bring forth, but some of it does. In West Virginia I have felt that it would be bad policy to make these examinations compulsory, or to make the corrections compulsory after we find them out, because there is a sentiment among the different classes of practitioners and Christian Scientists against compulsory examination and compulsory work; and I believe the best way to approach that subject is to get the liberty, only ask for the liberty, of making these examinations and reporting them. There is a large percentage of the public who appreciate the reports. I suppose all the practitioners in this house have had fathers and mothers who said they did not know this was not his first tooth; thought it would be replaced. If we can get a small percent of the people sending children in for services, pretty soon the remaining classes not now taking advantage of those results will take advantage of it. I believe every school in the State, as far as we can, ought to be examined. There ought to be some way in each locality where competent dentists can have the opportunity of examining these children and giving them a chart that may fall into the hands of their parents and get into their homes.

Dr. W. E. H. Caldwell, Wheeling: It is certainly very gratifying to hear of the progress that has been made in this State along this line. It was five years ago, at a meeting of the State Society, when this subject was first presented at the meeting in Wheeling. It has not been quite two years ago that there was a medical inspection act passed in this State, to come under the independent school districts. Some of the school districts of this State are a little more independent than others. For instance, the district in Ohio County; they are acting and working under a special act, as I understand it, and it is up to the Board of Education to settle the matter.

Dr. Chapman raised the point in regard to forcing this examination. That is the stand that has been taken by the Board in Ohio County. There are two districts in Ohio County—Wheeling city and the country district. There is a conflict there; the county follows whatever the city does. We have a large board; in fact, it is too large; that is the trouble with it; and we have a Superintendent there who is up-to-date, a wide-awake man, and in favor of having the examination; but the sentiment of the majority of the Board has been against it for the reason that they take the stand that it will look like we were trying to force the children to submit to this examination, and it would not be agreeable to their parents. They have had some trouble in compulsory examination; in fact, we had several long-drawn-out law suits in regard to the question; sent from the Circuit Court to the Supreme Court for final judgment, but I do not know whether final judgment has ever been handed down in regard to compulsory examination; and the Board has been very slow on that account in taking up this matter. The request was made by the Wheeling Dental Society to the Board of Education for the examination of school children just about a year ago, after our meeting last year, and we received a very cold reception, and the matter has just been lying in that way. I make this statement. Of course, I do not want the dentists in the other portions of the State, where you have local organizations, to think we have been sleeping at the switch. We have been trying in every way possible to get the consent of the Board to make an examination of the mouths of the children for statistical purposes; that was the first idea; to show the lamentable condition that existed; and by showing that we expected to arouse a public interest in the matter; get the public on our side, and after that we would have practically smooth sailing. But we have to get the consent first.

Dr. Fred E. Hess, Fairmont: I have had in mind some little thought of my own in regard to bringing this thing before the children of the schools; have studied about it quite frequently. Occasionally you find a little verse or phrase in a frame in the different rooms of schools. I think if we would paste a little verse in a frame in nice, neat shape, without any names connected with it, in regard to the care of the teeth, it is before them all the time, and they would not come in the schoolroom but what they would see it and think about it, and it would impress on their minds the value of keeping the teeth in better condition. The trouble with children, they neglect and forget about it, but if it is constantly put before them in some way they are more likely to do better.

Dr. Chapman: I do not like to be a chronic speaker, but I have another idea in mind about those things. We, sometimes, as dentists, feel that the physicians are against us and that they are antagonistic to us; and I must say that I feel gratified that in West Virginia this condition does not exist as much as in Virginia. About a month ago, when the State Medical Association met in this room, and I read a paper upon Pyorrhea, and the condition of the mouth relative to the general health and the intestines, I expected some criticism, but I was surprised with the warm welcome and with what courtesy the physicians received my paper and treated me. And I think if we can get an examination, even through the physicians, and get them in making their reports to simply look at the teeth to give, at least, some information, especially about fistulous abscesses, we can get a good deal of help from the physicians, too.

## OBITUARY REPORT *

BY GEORGE F. KEESE, RICHMOND, VA.

When the death of our dear friend and colleague, Dr. James Francis Thompson, of Fredericksburg, Virginia, was announced, all who knew him were ready to exclaim, "Truly, a good and useful man has passed away."

Dr. Thompson was born at Myrtle Point, Md., Oct. 29, 1835 Passing over his boyhood days his love for literary pursuits prompted him, after the completion of his academic course, to devote himself to the instruction of others, and so he gave himself to school-teaching in Kentucky in the years just preceding the Civil war. Those dark days changed his plans of life-work, and, after the completion of the requisite term, he was graduated as doctor of dental surgery from the Baltimore Dental College in 1863. At once pursuing his studies he was in due time graduated with the degree of doctor of medicine from the Medical Department of the University of Maryland, 1865.

In September, 1865, he became a citizen of Fredericksburg, and there commenced the practice of dentistry. His gentleness of spirit and high

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*Read before the Virginia State Dental Society, 1912.

sense of honor, combined with manipulative ability, soon drew to him the confidence and appreciation of a desirable clientele. These, mingld with the joys and pleasures which he found in his home with a devoted family, made his mind and heart care-free and rendered him as one whose presence was always desirable to enliven the occasion.

In the fullness and largeness of his heart he soon outgrew the environments of his office, and he longed to instill into others a higher appreciation of the possibilities which were lying dormant in his chosen profession within the state.

In conjunction with those whom he drew to him, there was organized in the City of Richmond, Nov. 3, 1870, the Virginia State Dental Association. He was chosen as its first president, and in his address, with no uncertain terms, he strongly advocated an appeal to the legislature for an enactment of law requiring a higher standard for professional dentists, thus launching forth the incipiency of what has become an ideal law and the admiration of many states of the Union.

In recognition of his valuable services and qualifications he served many years on the Board of Dental Examiners required by this law. Having served most acceptably his term as president he was, Dec. 15, 1874, elected as treasurer, and served for 20 years, giving to it his best endeavors, each year drawing to him, if possible, a more perfect confidence in his accuracy of methods. After serving so many years, he was, at his request, permitted to retire, and in 1895 was re-elected president and presided over an association which had greatly increased in numbers and efficiency. And during these many years of active service he seldom failed at an annual session to read, or send to be read, a paper bearing upon some subject vital to his profession. With advancing age he gradually became less frequent in his attendance upon the annual sessions.

Taking a new lease, however, upon life, he attended the last annual session of the association in the City of Richmond, and gave evidence of much activity and zeal, but yet stood as one answering, "Speak Lord, for Thy servant heareth." With his ripened years he awaited the summons, and with the Psalmist we may exclaim, "Behold the upright, for the end of that man is peace." We commit his body to its mother earth and,

"The flowers we lay upon his grave
May wither and decay,
But always fresh, his memory
Within our hearts shall stay."

In humble recognition of the wisdom of Him who holds our destinies within His hand we bow with gratitude for the long and useful life of our co-laborer. And as a further evidence of our sincere regard and affection we order that a blank page of our minute-book be dedicated to his memory, and that his family be assured of our sincere sympathy in their bereavement, and that they be furnished with a copy of this our tribute to his memory.

As your committeeman the above is submitted.

# SOCIETY ANNOUNCEMENTS

## National Dental Association

All reputable practitioners of dentistry and medicine are cordially invited to attend the 1913 session of the National Dental Association, which will be held in Kansas City, Mo., July 8th to the 11th.

This will probably be the most important meeting in the history of this association, owing to the fact that all the State dental societies that have met since the Washington meeting have voted to become constituents of the National.

The officers and committees have prepared an interesting program, but it is impossible to incorporate the Clinical Program in the JOURNAL announcements; however, the Clinic Committee does not expect to present the number of clinics which have been listed for the past few years, but have planned to present a smaller number, which are classified so that they will be most interesting. The following is the Literary Program:

President's Address, Frank O. Hetrick, Ottawa, Kan.; "The Need and the Plan for Exhaustive Scientific Dental Research," Weston A. Price, Cleveland, Ohio; "Orthodontia and Its Relation to Dentistry," Roscoe A. Day, San Francisco, Cal.; "Crown and Bridge Work," J. L. Howell, Denver, Col.; "The Missing Steps in Plate Work," Gail W. Hamilton, Council Bluffs, Ia.; "The Saliva," Percy H. Howe, Boston, Mass.; "Conflicting Opinions Concerning the Manufacture and Use of Alloys for Dental Amalgams," Marcus L. Ward, Ann Arbor, Mich.; "A Preliminary Report on the Action of $As_2O_3$," Herman Prinz, Philadelphia, Pa.; "Physiological Action of Nitrous Oxide Oxygen, Analgesia and Anesthesia," Carl G. Parsons (M. D.), Denver, Col.; "Something of the Etiology and Early Pathology of the Diseases of the Peridental Membrane, With Suggestions as to Treatment," Arthur D. Black, Chicago, Ill.; "The Value of the Radiograph in the Practice of Modern Dentistry," Howard R. Raper, Indianapolis, Ind.; "Dental Educational Harmony," G. S. Junkerman, Cincinnati, Ohio; "Prophylaxis," (illustrated with lantern slides), Burton Lee Thorpe, St. Louis, Mo.; "The Etiology and Progress of Dental Caries," Edgar D. Coolidge, Chicago, Ill.; "The Application in Practice of What Is Known Concerning the Diagnosis and Treatment of Diseases of the Dental Pulp," Harry B. Tileston, Louisville, Ky.; "Periapical Infection," Clarence J. Grieves, Baltimore, Md.

### RAILROAD AND HOTEL INFORMATION.

The Central Passenger Association, the Western Passenger Association and the Southwestern Passenger Association granted an open rate of

2 cents per mile in each direction in their territory, with a minimum excurson fare of $1.00. Tickets on sale the 5th to the 8th of July, and good returning up to July 20th. The Trunk Line Association has declined to make any concessions. Additional information can be secured from any local railroad agent.

A list of the hotels and their rates have been published, and we save space in this announcement by referring you to the June Journals. Those anticipating attending this meeting should promptly make reservation, if this has not already been done.

Frank O. Hetrick, *President,*
Ottawa, Kan.
Homer C. Brown, *Rec. Secretary.*
185 East State St., Columbus, Ohio.

## Research Workers Wanted

Competent research workers are wanted for the National Dental Association. State qualifications, experience, languages read, and preference for pathological, biological, pharmacological, mantallurgical or anatomical work. Address Weston A. Price, Chairman of Committee of the National Dental Association for Scientific Foundation Fund, 10406 Euclid Avenue, Cleveland, Ohio.

## Northern Indiana Society

The twenty-fifth annual meeting of the Northern Indiana Dental Society will be held at the Great Steel City, Gary, Ind., September 23, 24, 25, 1913. The society will be entertained by the Lake County Society in royal style, and nothing be left undone to make this a fitting silver jubilee meeting. For particulars, address W. LeRoy Meyer, *Secy.*
Rensselaer, Ind.

## Virginia State Dental Association

The next meeting of this Association will be held in conjunction with the Southern Branch of the National Dental Association at Old Point Comfort, Va., July 22-23-24, 1913. C. B. Gifford, *Cor. Secy.*

## West Virginia State Dental Society

The seventh annual meeting of the West Virginia State Dental Society will be held in the assembly room of the Chancellor Hotel, Parkersburg, W. Va., August 13-14-15, 1913. Opening session at 2:00 o'clock, Wednesday, August 13th.

Our new program committee have all thrown their hats in the ring, and they promise the best program ever presented to our society.

The executive council have directed me to urge every member to be present, and if possible bring a new member with you. Mark off (from your appointment book) these days of meeting. Do it now. You will learn something there, and we need you. The place of meeting, the Chancellor Hotel, Parkersburg; the dates, August 13-14-15.

Come, you will find the time well spent, the money (for the trip) well invested.

FRANK L. WRIGHT, *Secy.*

## New Jersey State Dental Society

The forty-third annual convention of the New Jersey State Dental Society will be held in the Beach Auditorium at Asbury Park, N. J., July 16, 17 and 18, 1913, beginning on Wednesday, July 16, at 10 a. m.

The exhibits of modern dental appliances and the latest in office and laboratory equipment will be in charge of Dr. William H. Gelston, 40 N. Thirtieth street, Camden, N. J., who will be glad to furnish information regarding rates and space still available. Early application from those desiring to exhibit with us this year will be greatly appreciated.

The clinics will be in charge of Dr. Henry Fowler, 114 N. Fourth street, Harrison, N. J., and will be comprehensive and of a very high order.

Further announcements will be made from time to time.

EDWIN W. HARLAN, D.D.S., *Secy.*,
47 Crescent Ave., Jersey City, N. J.

## Southern Branch N. D. A.

The fifteenth annual meeting of the Southern Branch of the National Dental Association will be held at the Chamberlin Hotel, Old Point Comfort, Va., July 22 to 25, inclusive. The Virginia State Dental Society will meet conjointly with the Southern Branch at that time.

THOS. T. MOORE, JR.,
*Cor. Secy.*, Southern Branch of N. D. A.

## Wisconsin State Dental Society

On account of the conflicting dates of the meeting of the National Dental Association, the Wisconsin State Dental Society will meet July 22, 23 and 24, at Madison, Wis., instead of at the usual time.

O. G. KRAUSE, *Secy.*

## South Dakota State Board

The South Dakota State Board of Dental Examiners will meet at Sioux Falls, South Dakota, Tuesday, July 8th, 1:30 p. m. For application blanks and further information, apply to

DR. A. L. REVELL, *Secretary.*
Lead, South Dakota.

## Fourth International Congress on School Hygiene

The most important health conference that has ever been held in this country is the Fourth International Congress on School Hygiene, which will take place in Buffalo, August 25-30, 1913.

This Congress will deal with every phase of school hygiene, and will be attended by the leading hygiene and educational people throughout the world.

An entire section has been devoted to Mouth Hygiene, with a large amount of floor and wall space set aside for an exhibit dealing with the same subject.

The organization of both the literary program and the exhibit has been placed under the supervision of the National Mouth Hygiene Association. This is the greatest opportunity that has ever been accorded the dental profession to present in an effective manner the important relation that mouth hygiene bears to the general hygiene of the body.

To make a showing in keeping with the importance of this subject, it is vital that the members of the organized dental profession throughout the country do their duty, both as members of the various organizations and as individuals. A few individuals cannot make an impressive showing. It is therefore imperative that, in addition to a literary program, and the presentation of an exhibit, a large number of dentists unite with the Congress and attend the meeting, thus establishing the dental profession's interest in and right to participate in the hygiene conferences of the world.

An elaborate literary program has been prepared and an extensive exhibit is being arranged, committees having been appointed representing each State in the Union.

W. G. Ebersole, *Chairman,* Division Mouth Hygiene,
800 Schofield Building, Cleveland, Ohio.

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## National Mouth Hygiene Association's Second Annual Meeting

The second annual meeting of the National Mouth Hygiene Association will be held in Kansas City ,Mo., July 9-12, 1913.

The Board of Governors will meet at the Hotel Baltimore at 9 a. m. on July 9th, 10th and 11th, to consider questions to be presented to the general body. These meetings are open to members of the association. Those having matters which they wish to present to the association for consideration must present them to the board at one of these meetings.

The regular meeting of the association consists of three sessions: Friday at 1:30 p. m., Friday at 8:00 p. m., Saturday at 9:00 a. m. (Open to the general public). A very interesting and instructive literary program is to be presented.

The association has charge of the Mouth Hygiene Section of the Fourth International Congress on School Hygiene, and the Board of

Governors' plan is to have, in so far as possible, the program duplicated at both the National meeting and the Congress.

The most important subject to be presented to the association will be the question of "Ways and Means for Conducting the Campaign of the Association in Its General Presentation of Mouth Hygiene to the Public." A complete, practical, economic and co-operative plan, which will permit every section of the country to begin an active appeal to the general public will be presented for consideration. It is desirable that every member be present when this important subject is presented for discussion.

W. G. EBERSOLE, *Secretary-Treasurer,*
800 Schofield Bldg.,
Cleveland, Ohio.

## What Do You Say ?

EDITOR SUMMARY: My experience in a dental practice of thirty-seven years is that too little importance is attached to the surgical operation of extraction of teeth. In many cases no fee is charged when artificial ones are inserted in place of them. And, again, thousands of teeth have been unwisely extracted by those who are not dentists (physicians). Not long ago a patient arranged to have a bridge inserted. The last molar was to be filled at a subsequent sitting and used as an abutment. Through neglect of patient returning at the appointed time, the tooth began to ache, and instead of going to his dentist or any dentist, rushed to a physician, who was near by, and had it extracted. You can imagine my consternation when news reached me that my foundation for the bridge was spoiled. By judicious treatment that molar could have been saved and made to fill a place of usefulness for many years. Would a physician care to have a dentist infringe on his territory? Every operation in dental surgery belongs to the province of the dental surgeon, does it not? Cannot the line be drawn between the mouth and body for health treatment? Who will be the next to speak on this question?

C. H. REYNOLDS, D.D.S.,
Clintondale, N. Y.

## State Board of Registration and Examination in Dentistry State of New Jersey

At a special meeting of the State Board of Registration and Examination in Dentistry, held at Newark, N. J., on Saturday, June 14th, the resignation of Dr. Charles A. Meeker as Secretary-Treasurer was announced, also the retirement of Dr. Meeker from the board on account of ill health, after twenty years of faithful service.

Governor Fielder has appointed Dr. Cornelius Kiel, of Hoboken, N. J., to fill Dr. Meeker's unexpired term. Dr. Alphonso Irwin, of Camden, has been elected Secretary-Treasurer. Hereafter all communications concerning the granting of licenses to practice dentistry in the State of New Jersey should be addressed to Dr. Alphonso Irwin, 425 Cooper street, Camden, N. J. The office of the New Jersey State Dental Commission is now transferred to Camden.

# THE DENTAL SUMMARY

The Magazine That Helps

Vol. XXXIII AUGUST, 1913 No. 7

OFFICIAL ORGAN

The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office; 195 16th Avenue, Columbus, Ohio
L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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# REGULAR CONTRIBUTIONS

## SOME IMPORTANT FACTORS IN CROWN AND BRIDGE WORK*

BY W. O. HULICK, D.D.S., CINCINNATI, OHIO

CROWN and bridge work is such an important factor in our practice, and there has been so much discussion as to its advisability, uses and abuses, that it will be well for us first to enter into an analysis of some of the fundamental principles involved in its adoption for lost organs of mastication before going into its mechanical possibilities. The subject is so big and has so many, many angles from which to view it and discuss it, and there is such a great diversity of opinion for and against its adoption, the benefits derived, and the deleterious results at times, that we probably will not be able to cover them all.

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*Read before the Odontological Society of Western Pa., 1913.

It is my wish and desire to give you some suggestions to consider, compare and criticise. To do this satisfactorily, it may be well to preface it with a slight review from a semi-scientific standpoint, what the natural organs are expected and required to do that we may more fully understand what is necessary, expected and required of these forms of replacement. The teeth in their normal and natural condition are perfect in form, arrangement and occlusion; incisors to bite off; molars to grind, triturate, and mix food stuff to nouish the body. The lower teeth are arranged in a mandible, hinged in condyles, so accurate indeed that no forcing out of their normal arrangement is possible so long as all teeth remain in the upper and lower jaws. These teeth are peculiarly arranged in bony sockets (alveoli) lined with periosteum, themselves covered with peridental membrane, the alveolus and jaw having a covering of mucous membrane, generally called gum tissue.

Now, in order to get an intelligent discussion as to the necessity of teeth to civilized man at this time and age and the needs in the future we must assume that they were intended to be a permanent part of our body and to do a good service throughout a natural lifetime. Furthermore, they should be kept in perfect condition, in perfect occlusion, alignment and number so long as the body lasts, to perform and to do perfectly their functions as designed by the Creator. This will be so carried on when the environment is normal. Thus the mouth will be kept cleaner, freer from decay and oral diseases, the body will naturally be more evenly balanced and healthy, senile decay will be put off, making the natural expectancy of man what it should be. Now, in this normal and natural condition, we will consider how much work is required of the teeth each day to keep the body well nourished and in good health. First of all, the teeth are required to prepare perfectly three meals each twenty-four hours, biting off and chewing or triturating each morsel of ordinary food, ten to twenty-five times, while meat will require from forty to sixty closures, a person consuming from ten to twenty morsels of meat each meal; or twice daily. We will conclude from these notations that the closures or triturations will be from one thousand to fifteen hundred times for an ordinary meal, while for a large meal it will be from two to three thousand. If you will stop to calculate the number of triturations per day, then multiply this with three hundred and sixty-five, you will find the sum total to be at least from one million to a million and a half, at the year's end. Again, you will please note that in this act of preparation, the stress will be from 25 to 150 pounds for meat of different kinds, according to the person's occupation and environment, while over the molars, the muscles of mastication can be trained to exert a stress of from two to three hundred pounds. I am giving you these figures for future comparison, to prove to you the enormous amount of work that is expected of the natural teeth, also the great amount of strain that will be exerted on one or more of these teeth when engaged to carry substitutes where one or more intervening teeth have been lost. Mr. Gladstone was once asked: "To what do you attribute your good health and long life?" He replied, "To proper mastication of my food." When asked what he meant, he said, "I have thirty-two good teeth, and consequently when I masticate my food, I give each morsel of food that goes into my mouth thirty-two bites."

From the foregoing facts we must acknowledge that if these normal conditions can be maintained, the teeth will remain well rooted, freer from decay, mouth and contiguous parts healthier, which is conducive to a better physical condition. Let it be understood that I am an advocate of hard food, vigorous chewing and thorough preparation, clean, wholesome mouths with a full complement of teeth, in perfect occlusion and alignment, so that the original plan of nature can be carried out as nearly as possible. That this is not carried out is evidenced every day by the constant loss of teeth from many causes; decay, predisposed and exciting, the latter acquired, causing loss of the nerve, followed by abscess and subsequent loss of tooth, unless they are thoroughly and properly treated and filled. Gingivitis, which is a natural process taking place in an abnormal way, usually from tartar deposits which is a normal constituent of saliva deposited in the protected places, which in time induces any of the following consequences: "Chronic, ulcerated, stomatitis," "putrid sore mouths," "receding gums," "sore," "spongy" or "bleeding gums," "chronic gingivitis," "gangrenous gingivitis," "non-suppurative gingivitis," "suppurative gingivitis," which is generally called "Rigg's" Disease or "Pyorrhea Alveolaris." Unclean mouths, in connection with tartar deposits, may also cause some of these same conditions, which in time induce destruction of the mucous membrane with subsequent loss of the teeth.

Dr. Fletcher, of Cincinnati, who has made diseases of the mouth a special feature from a scientific and practical standpoint, has adopted the following nomenclature, which covers these dreaded conditions:

Initial or simple alveolitis.
Non-suppurative alveolitis.
Suppurative necrotic alveolitis.
Acute alveolitis.
The descriptive sub-divisions are:
  Chronic non-suppurative.
  Chronic suppurative alveolitis.
  Necrotic, non-suppurative alveolitis, which is always chronic.
  Necrotic suppurative alveolitis, which is nearly always chronic, but may be acute.

Unsanitary conditions hasten these disorders, and in the advanced stages cause the loss of one or all of the teeth. Furthermore, it might be safely asserted that the above named diseases of the mouth probably cause the loss of more teeth than all other causes combined.

Many articles have been written, bringing out some very valuable discussion regarding the necessity of teeth to masticate food for the maintenance of the human body. Please allow me to quote from an article written by an eminent authority:

"There seems to be something about man when he finds he is able to supply these losses—eyes, limbs, hair and teeth—which so sets him up in his own estimation that he never loses an opportunity to try his hand, and in regard to mouth and teeth, it is my opinion that many times people are worse off for the effort. In cases where all the teeth are lost, great benefit may result from substitutes, but no artificial denture is at all comparable to good natural teeth, even if the work be perfect, but poor work seems to be the rule, and perfect work rare." To further quote from this same paper: "With civilized men the teeth have almost ceased to be a necessity, as the grinding of food can be replaced by machinery and cooking." "The necessity for masticating food is almost completely done away with in man."

I agree with that part of the aforesaid, regarding the loss of the entire dentition, and will admit that predigested food may maintain life for a time, but we are all agreed that the latter is not in accord with the intention of nature, and cannot be continued any great length of time. When artificial teeth can and are made to successfully perform the process of mastication there is no logical reason for avoiding the participation in solid food.

Persons who have suffered a partial or total loss of teeth and who live on prepared food, always show signs of malnutrition, are anemic and generally show signs of nervous and intestinal disorders. I will quote another eminent author: "The mere fact that the chemist has prepared artificial food that can be digested without mastication is no argument against the use of teeth for masticating purposes. They have been obliged to do this to help out the people without teeth, or the people who are too lazy to use their teeth. In a certain sense nature after a time gets rid of the teeth, but why? Not from a physiologic standpoint. It is senile decay. With proper care of our teeth and of the general health and by eating proper food, senile decay can be put off."

Gentlemen, I have gone into the above with a definite purpose. First, to fix in your minds the necessity of teeth to the human body and what is expected of them in their natural condition. Second, unsanitary mouths or other conditions, which cause the oral diseases and loss of teeth, and the effect on the body and general health. Third, replacements, their necessity, advisability and benefit derived by their adoption. Fourth, amount of service required of such replacements. Fifth, oral diseases and systemic disorders caused by their insertion at times. In order that you do not misconstrue my meaning, I will say the problem is like choosing between the devil and the deep blue seas.

The article by Dr. Wm. Hunter, of London, England, on "Septic Dentistry," has struck the keynote and has made us sit up and take notice. The reading of this article left a bad taste in my mouth, as I heartily agree with him in part when he says: "The worst cases of anemia, gastritis, colitis of all kinds and degrees, of obscure fever of unknown origin, or purpura, of nervous disturbances of all kinds, ranging from mental depression up to actual lesions of the cord, of chronic rheumatic affections, or kidney diseases, are those which owe their origin to, or are gravely complicated by, the oral sepsis produced in private patients by these gold traps of sepsis. Time and again I have traced the very first onset of the whole trouble of which they complained to a period within a month or two of their insertion. The sepsis hereby produced is particularly severe and hurtful in its effects, for it is dammed up in the bone and in the periosteum, and cannot be got rid of by any antiseptic measures which the patient or the doctor can carry out. Moreover, it is painless, and its septic effects therefore go on steadily accumulating in intensity without drawing attention to their seat or origin."

Dr. Hunter has left the impression, or rather the writers who have commented on his articles through the press, that it is a fact beyond a question of a doubt, that all replacements of a fixed nature produce these conditions to a greater or lesser degree. That this is so, to a marked degree, there is no question, but I wish to take exception to the positiveness of the statement when he says, "Such are the fruits of the baneful so-called 'conservative dentistry.'" We must agree with him and my articles will bear testimony that I am heart and soul in accord with the following quotation:

"The problem is an important one for the dental profession and its solution is an important one to the interest of public health. For while a large body of the profession are engaged in dealing successfully with the difficult problems of dental diseases and of oral sepsis, another body is no less steadily engaged in promoting sepsis of the worst character and degree, by ignoring the fundamental truths connected with the anatomy, physiology and pathology of the tissues with which they deal." To gold cap a healthy or diseased tooth in order to beautify or preserve it is the negation of every one of these truths. "A veritable apotheosis of septic surgery and of surgical and mechanical malpractice." I cannot quite agree with the following, for I have made observations of dental operations from the hands of dentists from almost every country. "In no class of patients, and in no country are these, in my observation, more common than among Americans and in America, the original home of this class of work."

My friends, pity 'tis that 'tis true, that many thousands of dentists in our land are doing today just what Dr. Hunter so ably describes. He has proved it. On the other hand, it is not the writer's intention to leave the impression with you and the public that this is representative of all American dentists, for you know, and I know, that perfectly scientific, thoroughly aseptic and entirely sanitary and conservative dental operations are done by the majority of our dentists all the time. This reminds me of the story of a man who said to his friend: "I hear you told Mr. B. he was so and so." He said: "No, I didn't, I thought he knew it already." Dr. Hunter possibly thought he was telling us something new. We all knew it already—have known it for a long time and many of us are fighting agaist the evil, for evil it is, and we glory in Dr. Hunter for starting the fight in our land and I propose to keep up the fight, but in a different way.

## THE CAUSE.

Why do so many ignore and disobey almost all of the obligations imposed on them, making innocent trusting patients victims? Partly greed for money, for we all like the dollar; partly ignorance; not always, but ignoring many of the fundamental principles involved in sane, sanitary, aseptic dental operations—and why? First of all we must go to the bottom, to the "fountain-head" as it were, and I will not apologize for this statement, as my experience as a teacher for over ten years will bear me out in the statement that our colleges are largely to blame. The students accepted in our institutions are not up to the standard in mechanical and manipulative ability, the teaching, in most of our institutions, may be theoretically correct, but the practical teaching, gentlemen, is bad, not all, do not mistake me, but as a general rule. Let me prove it. In some colleges, I say some, remember, unfortunately, this is true. The practical departments, clinics, are run for profit, to make money, not alone for the maintenance of this department, but for a profit on the right side of the ledger; I know whereof I speak, for I was on the floor for eight years. What is the result? Students are instructed to "get the work out," with the usual consequence that abutments are faultily prepared, cap crowns or other attachments and supplies are poorly adapted and constructed with failure and oral disorders generally accompanying such operations. The student goes out to practice in ignorance of correct technic—physical and mechanical requirements and possibilities, often continuing to so construct replacements indefinitely.

The dental laboratories come in for a big share of the blame, for some of the very poor mechanical replacements you see every day, their work is to models entirely and poorly constructed, and not sufficiently strong to do the work imposed; there are exceptions I grant, to this rule, for many times the work from some of our laboratories is far better than the dentist himself is capable of doing. I overheard an order being placed for 75 gold crowns, with the instructions to make them "big—we will do the rest." I recently heard of a very successful (?) crown and bridge operator who said his success lay in "not letting them hit." I will show you some pictures shortly, many of them radiographs, which will convince you that the above statements are too true.

The advertising companies come in for a very large amount of blame for the condition Dr. Hunter describes, a remedy for which we will presently consider. Last, but not least, the public comes in for a share of these conditions, as I will try to make it plain to you that the dentist is not wholly to blame for all oral sepsis and other conditions that crown and bridge work cause. The term ''fixed bridge work'' seemed to fill a long-felt want in the minds of the people years ago, for it could be permanently fixed, cemented to place, so that it could ''never'' come out, which appealed to them as being nearer akin to natural teeth, and after a time the wearer becomes unconscious of their presence in the mouth. The term ''false teeth'' is extremely repulsive to many people, and the fact that they must be removed frequently for cleaning, is a constant reminder that they are false teeth, and they can never forget them; also they are advised that a cemented bridge is just as good as the natural ones and will last for the remainder of their life; under this advice they feel perfectly secure—not alone as to usefulness and durability, but also cleanliness and health.

In this feeling of security they become neglectful of their mouth; unreasonable as to the amount of service such replacements are capable of performing, careless as to stress brought to bear on single porcelain teeth, or bridges, for have they not cost much money and were they not expected to last always?

Under these conditions, undue stress or impaction will break porcelain veneers, or full porcelain crowns—split roots or destroy a well constructed crown or bridge.

Uncleanliness or carelessness will often cause the loss of replacements in an unreasonable length of time, for it is my belief that most patients treat their mouths with replacements about as they are in the habit of treating them without.

Do patients recognize the obligation they owe us? Do they guard our best efforts, so as to insure longer service and usefulness of a replacement? Many do, and many do not.

### THE REMEDY.

It is my intention to educate by comparison—by making my colleagues as ashamed of themselves as I have been of myself many times in the past. I propose to put the moral obligation up to the profession as it has never been before. Are we not our ''brother's keeper''—are we not in a measure the custodians of their health and welfare? Do you do a service for your brother as you would have it performed for you? If you needed a crown or bridge replacement who would you have do it? Have you ever extracted teeth that were crowned by yourself some years since? Have you ever removed a poorly constructed bridge from an ill-kept mouth? What did you think of it? What did you think of yourself if it was of your own creation? What did you say about it if from the hands of your neighbor? Would you tolerate such a bridge in your own mouth? Well, I have threshed this out many times, and it was my resolve many years ago to do a Golden Rule service, as nearly as possible, a service for you as I would have it performed for me under the conditions presented. Better today than yesterday and if defects were found, endeavor to do better tomorrow, and do it. Do we all know good dentistry from bad? Many do and many do not. Do we all know Pathology, Physiology, involved in dental operations? Many do and many do not. Do we all know the fundamental mechanical principles involved in dental restorations? Do we all know the amount of service that is required of teeth supporting a bridge? Many do, and many do not.

Recently before a dental society where I read a paper, many made the remark that their failures were through ignorance of these principles; that their technic was not perfect—that they were practicing as taught, but were eager to do a better service; a nearly perfect service. You and I are working to that end; we are working earnestly, diligently to improve our technic, mechanical and physiological possibilities, so as to improve the pathological and hygienic conditions.

The Oral Hygiene movement is helping wonderfully in this work, by teaching the public how to clean their mouths and teeth, and keep them so. It is teaching them the value of the natural organs and the necessity of keeping them in perfect condition.

As to crown and bridge work, or other replacement, I believe the public should be taught the use and abuse, the possibilities and probabilities, the amount of service expected and length of time it is expected to last.

I believe a patient has a right to know, or should have the knowledge to be able to judge a good service from a bad, for it is my belief that not half of those we serve know good service from bad. I also believe that the demand for better service is greater by the masses, and that those of us who are not up to the standard will be obliged to improve, or be relegated as back numbers.

The patients we serve are trusting, too much so at times, I fear; how are they to know whether a crown is well adapted or not? what knowledge have they as to the occlusion and adaptation? very little; in fact, all they have is confidence, which, gentlemen, is misapplied many times, placing the ever-trusting, confident patient completely at our mercy.

The masses take all these things as a matter of fact, that we are capable and trustworthy; they are too busy with their own affairs to doubt that this is so. It is our duty to so conduct our professional obligations as not to betray that trust.

I recently had an example of this misplaced confidence presented to me in the form of some "Alveolar Dentistry"—so-called; full upper and lower bridges, which I shall show you on the screen shortly.

My friends, you will pardon me for a drastic statement: The laws of our land are at fault in a measure for legalizing an illegal operation, an operation that is criminal, literally speaking, an operation that endangers health and life; an operation that enables a man to obtain money under false pretenses, for are they not practicing with a "bonafide diploma" under a license from the state in which they practice?

I believe work of this character should be prima facia evidence of incompetency, and such a man's diploma and license should be taken away, as a protection to the public health and welfare.

It is reported from New York that twenty states have, or contemplate, adopting yearly registration laws, also requiring all persons engaged in the practice of dentistry to conduct business under individual name, with name on front door of place of business. Kentucky has such a law in force, which works successfully, resulting in putting all advertising companies cut of business, except two.

These laws will give the State Board of Dental Examiners power to revoke a license for malpractice or incompetency.

I have tried to point out a few remedies to prevent "oral sepsis;" we will now look into some

### PRACTICAL POSSIBILITIES.

We will agree that some patients would be better off without some attempts at replacements, but we are also happy to know all are not so constructed, and it is my pleasure to prove that good, serviceable, sanitary replacements have been and are made.

Replacements of some kind are a necessity for proper mastication, and so long as teeth are lost, by whatever cause, just so long will dental substitutes be constructed, even to the end of time.

Now, this being the case, we will look into some of the wonderful opportunities for exercising skill and judgment of the highest order.

We must be ever mindful of the aforesaid diseases of the mouth without replacements, also those directly caused by foreign bodies, which crowns and bridges are. We should also remember the great amount of service expected of the teeth in the act of trituration and preparation; the possibilities and probabilities of all replacements in this act.

Each case presented should be individual; we should prescribe treatment as a physician would prescribe; according to conditions. And should they be unfavorable, no fixed replacements should be advised—if otherwise, study models should be made to plan a method that will give the longest and best service possible, either removable or fixed. If of a fixed nature, we should know something of the individual—habits regarding care of their mouth and teeth; if careless, it would follow they would be more so with bridge work. If in the habit of using hard food, which requires hard chewing, work should be correspondingly constructed.

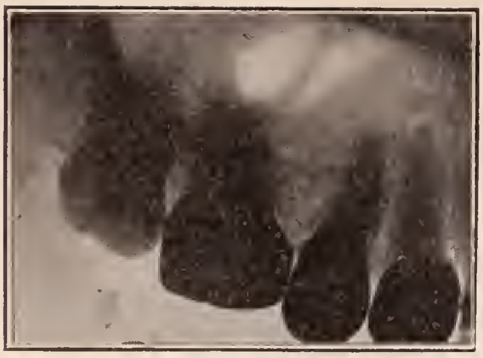

Fig. 1—Radiograph of Upper.

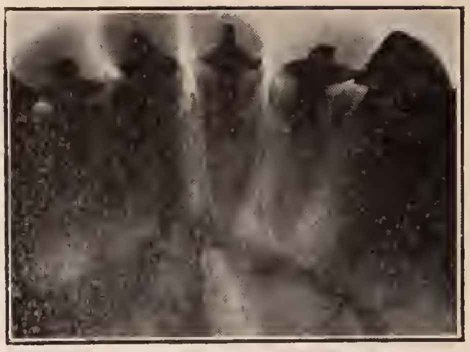

Fig. 2—Radiograph does not show faulty adaptation, which is as "bad" as it is possible to adjust porcelain replacements.

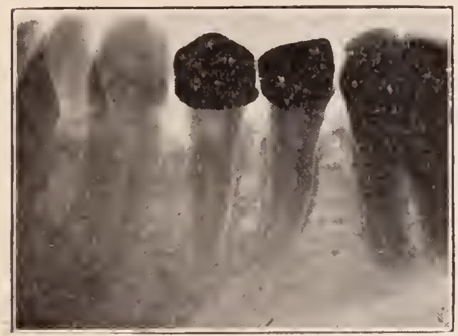

Fig. 3—Lower—Faulty adaptation of this case has caused intestinal disorder that is chronic, according to physician's diagnosis. I will make corrections and watch the case.

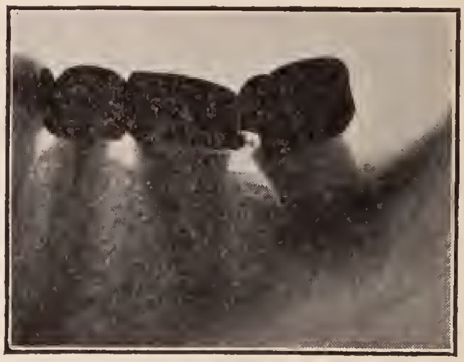

Fig. 4—Radiograph of imperfect gold cap crowns. Correction in Fig. 5.

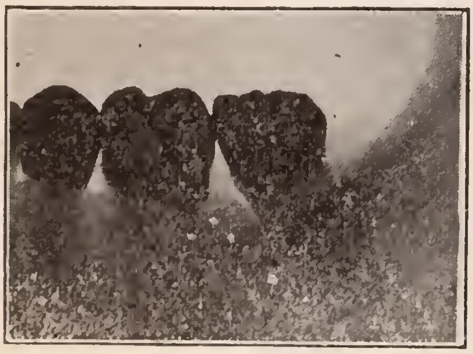

Fig. 5—Radiograph of correction of Fig. 4. Technically perfect crowns in two parts Please note contact points and interdental spaces. Note Fig. 4 in this respect.

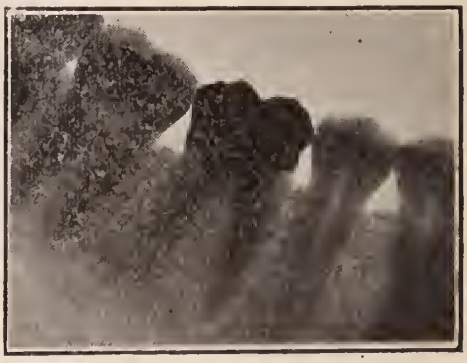

Fig. 6—Radiograph of a technically perfect gold cap crown.

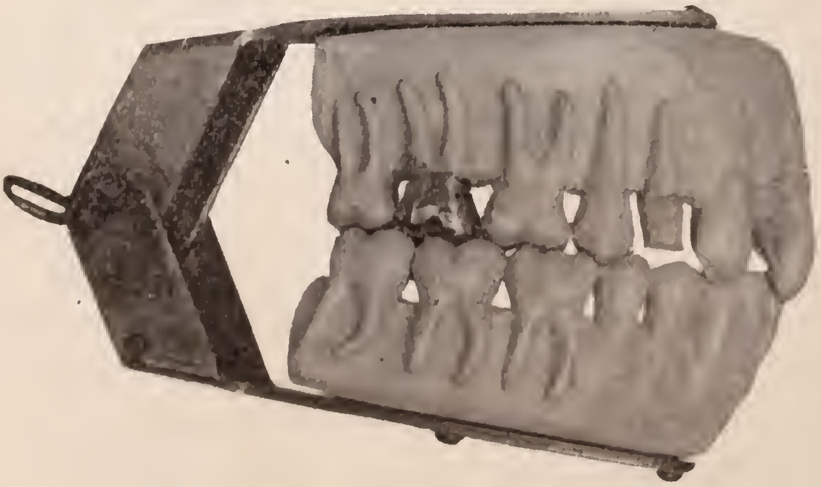

Fig. 7—A technically perfect gold cap crown, made in two parts.

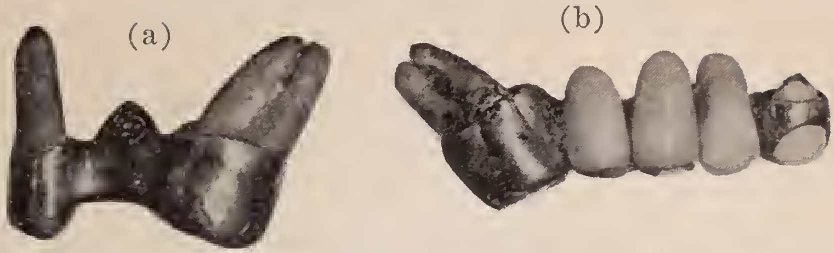

Fig. 8—The kind that did come out, largely due to faulty adaptation of molar crowns. 3-16 in. space at cervical of crown (a), 1-8 of crown (b).

The conversion was prohibitive for bridge in one piece.

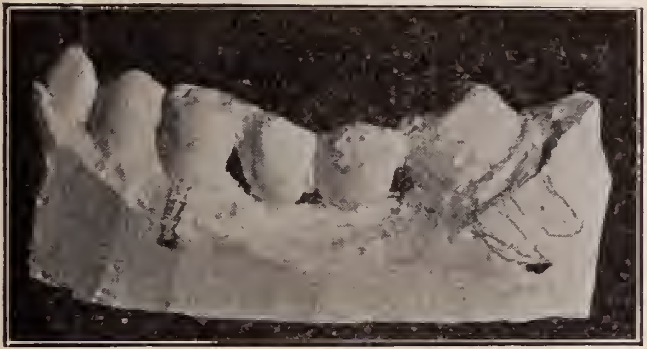

Fig. 9—Practical Case of Conversion—Bridge made in two parts, which will bear out the above statements.

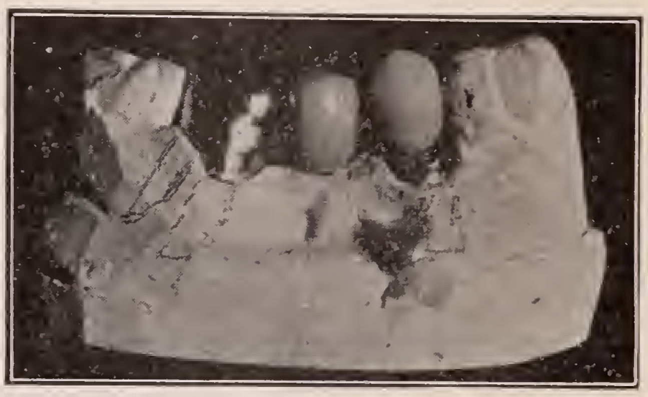

Fig. 10 — Practical case of conversion made in two parts with porcelain teeth. A removable bridge contra-indicated in both cases.

Please see technique of Figs. 9 and 10, in former issue of Dental Summary.

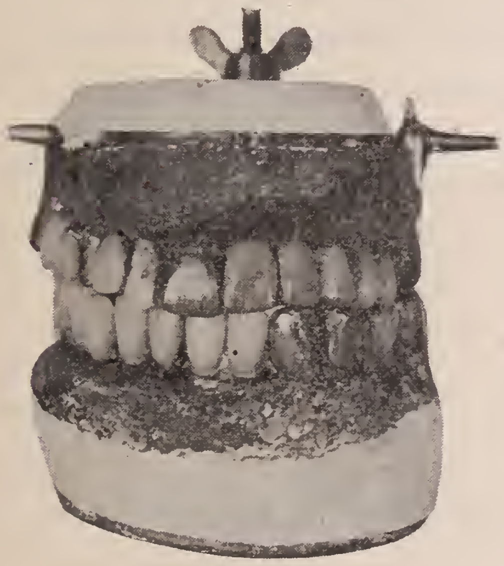

Fig. 11—Alveolar Dentistry.

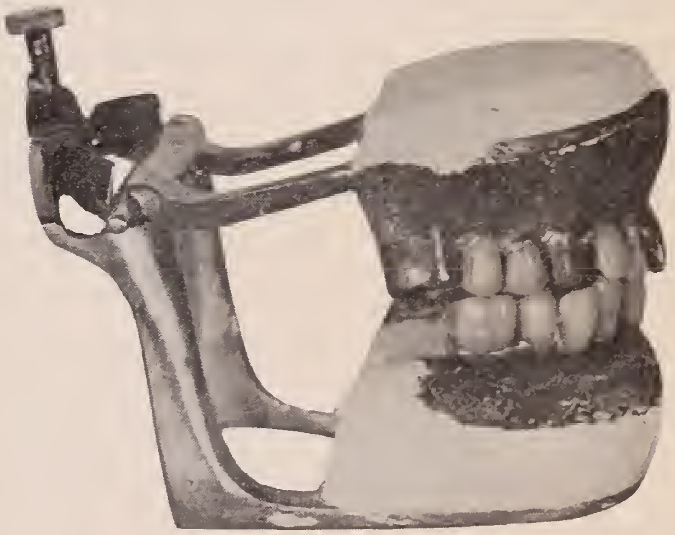

Fig. 12—Alveolar Dentistry.

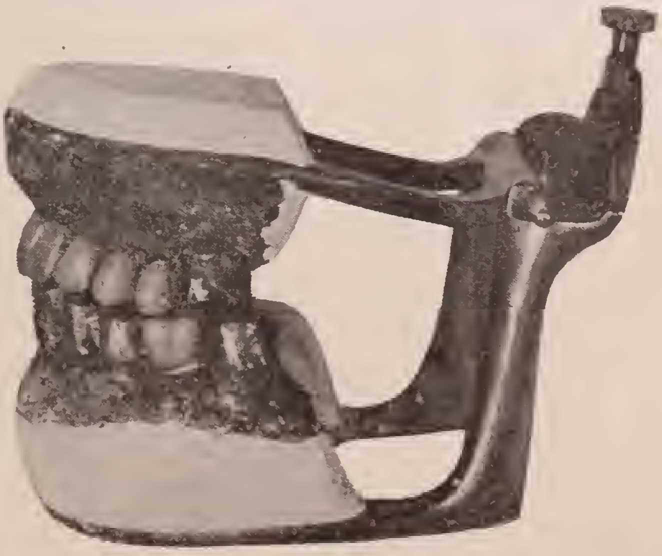

Fig. 13—Alveolar dental replacement, so-called, no occlusion. "Just strike here and there." No abutment in lower from the bicuspid extending around to the right ridge; also no saddle.

We should ascertain if teeth to be used as supports are well rooted, for it is not reasonable to expect a short rooted tooth will carry an extra load for any length of time, neither is it reasonable to expect two teeth to carry the extra load of more than two supplies for any length of time.

The teeth which support the bridge are required to bear more force and pressure than nature intended—where the piece is large, many times more—and, the bridge being permanently attached, at no time can any rest be given the abutments, or the contiguous parts by its being removed.

Thus it would seem a violation of all the laws of nature to expect four teeth with caps or crowns to support a piece of bridge work of 14 teeth, owing to the extra pounds' force imposed.

Bearing upon the requirements in this particular, it has been stated by some authorities that by uniting two or more teeth. "the movements of each is so modified and restrained as to enable them to successfully withstand more force than the sum-total of their separate resistances."

I don't believe nature will strengthen teeth so engaged to accommodate our methods of misapplying force that is unnatural, and unreasonable in their demands for proper mastication. The force of the bite, or the pounds' force which the jaws may be closed upon an object, varies greatly among different persons, and is dependent in larger degrees upon the condition of the peridental membranes and upon personal habits in the use of the teeth in mastication, than upon muscular power.

In this connection, where a fixed bridge is employed for mastication, the force of the bite of an individual is modified from time to time, pounds' pressure becoming less and less as the teeth engaged as supports weaken. It would naturally follow that no bridge work is permanent, and that to conserve the usefulness of abutments for the greatest length of time, fixed bridge work must be constructed on natural lines, cusps to fit into cusps, so as not to force themselves or their antagonists out of alignment or occlusion.

Where mouth hygiene is doubtful, the pathological conditions unfavorable, bridge work of a removable nature should be employed, not alone because of better sanitary conditions, but also to equalize force.

Recognizing the stress in pounds' pressure in the act of mastication, and the number of triturations or closures, where a large restoration is necessary, it should be made removable.

In a removable bridge the teeth engaged serve mostly to hold the piece in position, the ridge being covered by a saddle to receive and resist most of the impact, also to partially resist lateral motion in trituration, as there is a natural mobility which in time has a tendency to loosen teeth. As to a natural mobility which in time has a tendency to loosen teeth. As to the hygienic conditions by comparison, as between fixed and removable bridges, if the abutting teeth have been well prepared—which I take it there is no excuse for not so doing—the cap or crowns well adapted, which can be made so; assuming that the case is selected, as above noted, there seems no difference in my mind.

In a small fixed bridge there is little more surface to be kept clean than with the removable one, where the abutments are fixed, assuming the pathological conditions to be good, and habits of patients cleanly.

Where pathological conditions are not good, and replacements large—no fixed bridge should be adopted under any circumstances.

A noted author has said "the mutilation of one or more good back teeth for the purpose of supplying a bridge seems to be wholly unjustifiable, even if the work always remains good."

With modern methods this does not seem a necessity, as inlays under favorable conditions are very satisfactory.

A word regarding porcelain crowns, with or without bands, cap crowns, for single restoration, or to serve as abutments, I believe beyond a question of doubt they can, and are adapted to such a degree of perfection as to cause a minimum amount of irritation at the gum margin. It is all a matter of technic. If this technic is perfect, and the mechanical and natural laws are perfect, the case being selected, as indicated above, it is possible in a measure to avoid oral sepsis, and premature loss of teeth so frequent when replacements are employed where the strictest care is not taken to accurately approximate the natural. It is now my pleasure to present by means of slides some conditions which have recently come under my observation, and I am convinced that a view of them will convince you that great reforms are forcibly indicated.

## DO YOU WANT TO BE HAPPY?

One of the familiar torments we impose upon ourselves concerning the inevitable is our vexation at growing old. Yet we love life, we want experience, and, alas, what other way is there to prolong and obtain these, except to watch the years go by? "If youth only *knew*. If old age only *could*," runs a French saying, pronounced with melancholy. Youth does know, and old age can, if they will not want to change roles with fretfulness and impatience, living in the future when it is too soon and in the past when it is too late; demolishing thus the better chance of joy.

The word "happiness" (good hap)—in German "glueck" (luck), in French "bonheur" (good fortune)—by its origin would tend to thrust the responsibility of our destiny in this regard upon the shoulders of Fate. But it is not until we take things in our own hands and decide *we do want to be happy* that the magnetic current begins to turn our way. Otherwise we plod blindly along, attracting to ourselves a certain kind of misfortune, and declaring each time the wheel revolves in our disfavor: "That's just my luck." Then, later, as we look back at our lives, we find that we can sum up the minor circumstances in the one trite saying: "I've had a great deal of trouble, and most of it never happened."

# THE ARTIFICIAL RESTORATION OF LOST OR MISSING TISSUES IN CONGENITAL CLEFT PALATE *

BY VETHAKE E. MITCHELL, D.D.S., NEW YORK CITY

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MY OBJECT in presenting this subject is to show by actual demonstration the possibilities of improvement in the voice and speech, in this class of oral defects, by means of an artificial substitute for the missing tissues, and the advantage of such a procedure over surgical operations.

Congenital cleft palate is the result of arrested development of the parts involved, and the failure of these parts to unite during their developmental period in fœtal life. The fissure may be of any degree from a slight notch of lip or uvula to a complete cleft of lip, alveolar process, palatal bones and vellum palati.

The origin of cleft palate must be looked for among the pre-natal influences—generally conceded to be faults in the developmental process. The formation of the maxillary process begins at a very early period in fœtal life, namely, about the 28th day. At the end of the tenth week the palatal processes have united. The process of uniting begins at the anterior aspect and progresses backward, the uvula being the last to unite. Consequently, the size and extent of the fissure depends largely upon the time of interference in the process of development.

Science has been unable, as yet, to solve the problem as to the causes. Many theories have been advanced, such as *faulty nutrition, heredity* and *maternal impressions.*

## FAULTY NUTRITION.

Some have thought this defect to be caused by faulty diet; from the exclusion of meat as an article of food, or the introduction of an insufficient quantity of calcium phosphates into the system of the mother during gestation. This theory has very little weight, as it is a fairly well established fact that union, or coalescence of the tissue, does not depend upon ossification, for union takes place in advance of ossification. It is also a well established physical law that if there is not sufficient calcium salts ingested by the mother to meet the added demands for the building of the bony frame work of the fœtus, and her own waste and repair, the material already stored up in her system is drawn upon to meet the demands of the fœtus.

## AS TO HEREDITY.

The question of hereditary influences would seem to play an important part in the production of this defect, but as yet all the facts that have been deduced do not seem to prove a theory. Family histories in some cases seem to show hereditary influences, but most do not. Dr. Chas. B. Davenport, of the Carnegie Institution, Department of Experimental Evolution, who has made extensive investigation along this line, writes me: "While we have been able to accumulate a large number of pedigrees, we have not been able to get the exact key to the method of inheritance of cleft palate. We know merely in general that it is inherited, or that heredity plays an important part in its production."

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*Read before the Oral Surgery Section of the First District Dental Society, at the Academy of Medicine, New York City, March 25, 1913.

### IN REFERENCE TO MATERNAL IMPRESSIONS.

Most women who are so unfortunate as to give birth to a deformed child feel sure that it is a result of maternal impressions, such as fright, seeing a like deformity, etc. How much of truth there is in this we do not know. Dr. John S. Marshal, in his work on oral surgery, says: "When we know more about the influence of the nervous system on cell life, and the effects of the physical and mental condition of the parents at the time of conception and of the mother during gestation, we shall be able to consider the question from a scientific standpoint. Until then it would be mere speculation."

Another theory has been presented, that pressure exerted upon the mandible, by the unnatural position of the fœtus (the mandible lying against the sternum); forcing it up between the two halves of the maxillary bone, keep these from uniting. This hardly seems reasonable, as union of these tissues takes place at such an early age. We are still in the dark, but science will, in time, no doubt, shed more light on the subject.

Whatever the cause, the fact remains that these conditions exist, and are presented to us for treatment. What is to be done for these patients?

There are two reasons for attempting to correct this defect, either surgically or mechanically: First, the improvement of the general health, and, second, the improvemnt of the voice and speech. Nature intended that we should have separate channels for the air we breathe and the food we eat. We know that this is so because of the difference in the anatomical formation of these cavities. Provisions are made in the nasal passages for the warming, moistening and filtering of the air before it passes into the lungs. The oral cavity does not supply these requirements. On the other hand, the highly sensitive mucous linings of the nasal passages are most unsuitable for the passage of the different foods. In cleft palate cases some food necessarily passes through a part of the nasal passages, and by constant irritation produces a catarrhal condition of these tissues, causing them to secrete a viscid mucus, which contaminates the air they breathe and the food they eat. But this is not all: These unfortunates are conscious that their defect is announced whenever they attempt to speak. This has a deplorable effect upon their physical and mental development.

SECONDLY: The palate is one of the most important organs of speech. Its functions are concerned in the forming of tone of the voice by regulating the shape and size of the resonance chambers, and to close off the nasal passages in the emission of certain sounds. This being impossible to a greater or lesser extent in cleft palate cases, speech is very defective and gives it that peculiar quality which all can recognize.

To understand more fully the tissues involved and their functions, let us refer to these drawings:

FIGURE I. shows the nasal cavities, with the turbinated bones, superior, middle and inferior, on either side, each forming a resonance space, and when separated by the septum, with the hard palate beneath, forming six distinct resonance spaces.

FIGURE II. shows these spaces better.

FIGURE I. shows also the large naso-pharynx, another resonance cavity, regulated as to size and shape principally by the soft palate and uvula. Here can be seen also the oral cavity, still another resonator, with the tongue, soft palate, lips and teeth all concerned in the production of voice and speech.

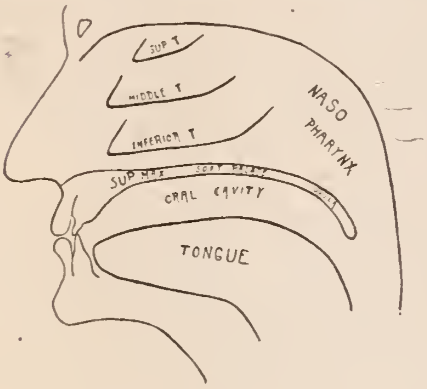

Fig 1

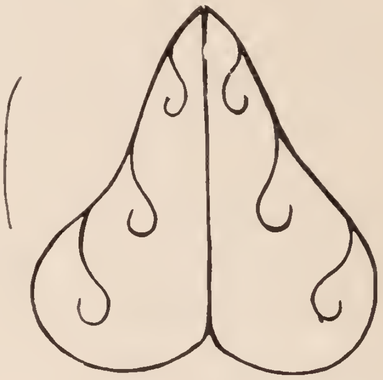

Fig. 2

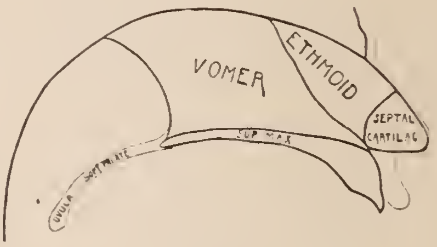

Fig. 3

From McClellan's Regional Anatomy we take the description of the Nasal Septum (Fig. III.):

"The *cartilage of the septum* is a smooth triangular plate inserted posteriorly into a groove in the perpendicular plate of the ethmoid bone: Anteriorly, where it is thicker, it is connected with the nasal bones and adjacent lateral cartilage, and below with the vomer and palatal processes of the superior maxillary bones. The septal cartilage separates the anterior portion of the nasal cavities. The inner wall is the smooth septum formed principally by the perpendicular plate of the ethmoid bone, the vomer bone and the septal cartilage."

Without any question, surgical closure of the cleft would be the ideal method of treatment, if it were possible to restore the function of the tissues. Many methods by different surgeons have been proposed and attempted with various degrees of success, as far as the improvement of speech is concerned, and all agree that the best results are obtained when operated upon in early infancy. As a matter of fact, these children, owing to their inability to receive nourishment, are usually in no condition to undergo the operation, and I am beginning to doubt the advisability of such a procedure. It occurs to me that the *first* and *all-important* assistance to be rendered the cleft palate child should be an *aid in the way of* *receiving nourishment.* For upon *that* its whole future depends. In order to overcome the difficulty, twelve years ago I conceived the idea of constructing a temporary soft rubber appliance covering the roof of the mouth, to which I fastened a rubber nipple. When this was placed in the mouth the cleft was closed, allowing normal suction, improving greatly the feeding of the child. (*Feeding Appliance* illustrated in FIGURES IV.A and IV.B).

Dr. Truman Brophy, of Chicago, states: "The deformity is not the result of defective formation of the palatine plates, nor congenital deficiencies of the parts in question, nor arrested growth of the palate, nor absence of a portion of the palatine tissue. All children who have congenital cleft palate, with rare exception, have in the palate the normal amount of tissue, although it is not united in the median line; it is *cleft.*"

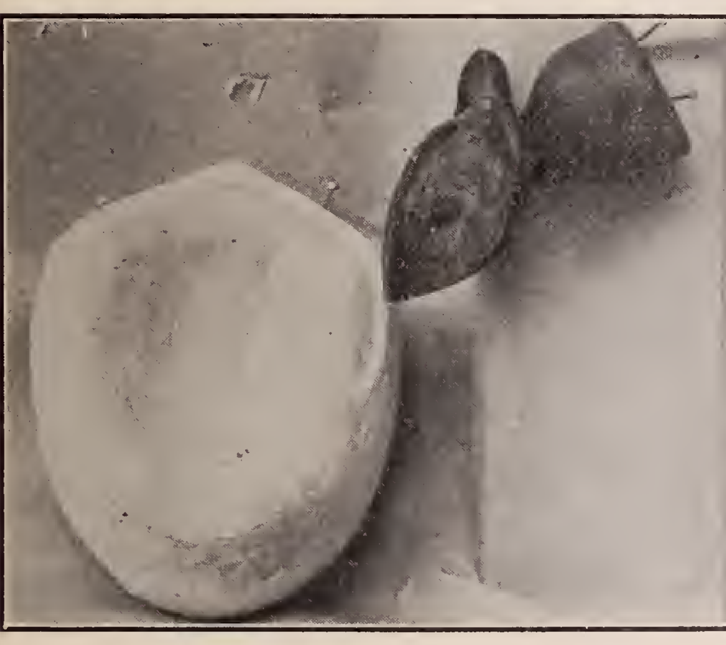

Fig. 4 a

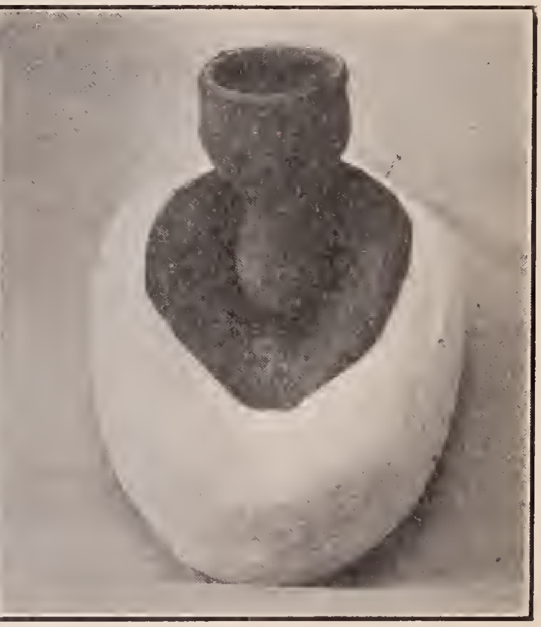

Fig. 4 b

This leads me to infer that generally there is no lack of tissues in these cases, but merely a separation of the bones, which, when brought together by compression would close the cleft without any stretching of the tissues; normal growth of the arches would then take place.

Dr. Brown, of Milwaukee, does not seem to agree with this theory, for in his writings he states: "For patients upon whom closure, or attempted closure, of the palate fissure has been performed, according to well known methods, by forcibly crowding together and wiring the maxillaries, something must be done. This class is apparently increasing, because of the fact that children so treated in infancy are now reaching an age when the disastrous results are noticeable. Correction of these conditions must be made before these individuals can ever hope to enjoy the benefits of the good speech, appearance, and health, which are their birthright."

Now, from my own experience, in all the cases that I have treated not one shows more than normal width of arch.

Dr. W. J. Roe, of Philadelphia, says: "The closure of the cleft, even if surgically successful, unless it restores the functions of the tissues, invariably leaves the patient worse off than before, and also frequently prevents satisfactoy subsequent treatment.''

These conditions led me to make a special study of mechanical means by which these patients could be helped, especially those of the adolescent or adult age.

To Dr. Norman W. Kingsley belongs great credit for his efforts and progress along this line.

Appliances of many shapes and of different materials have been devised for the closure of the cleft, but with apparently little regard for the restoration of the nasal passages, to permit normal respiration, or the restoration of the resonance chambers for the improvement of voice and speech.

In the appliance which I present to you, all these things have been taken into consideration, and an attempt has been made to restore all missing tissues and their functions.

The appliance here illustrated and described was constructed June, 1912.

FIGURE V.: Photograph of Model of the Mouth.
FIGURE VI.: Photograph of Mouth Showing Cleft.
FIGURE VII.: Photograph of Mouth with Appliance in Position.

The *history of case* is as follows:

Miss K., age, 31; second of four children; no deformity in any other member of the immediate family. Mother, healthy, slightly tongue-tied; Father, healthy. Her physical condition is good, but slight of build and undersized.

### DESCRIPTION OF CLEFT.

A division extends through the uvula, the soft and hard palate to the alveolar process. Width of cleft, at posterior border of hard palate, thirteen-sixteenths of an inch. Vomer bone entire missing.

Nothing had been attempted surgically. Dr. Joseph D. Bryant advised against operation at four years of age. Miss K. feels that she is greatly indebted to Dr. Bryant for this advice. At nineteen an obturator was made and considerable improvement in speech resulted. This was worn for seven years, when a second obturator was constructed on same style. This was worn for almost five years. The case was then referred to me to see what further improvement could be accomplished.

A plaster impression of the mouth was taken in two sections by first filling the posterior nasal cavity and cleft with plaster, to which had been added a little asbestos fibre, and allowing it to harden. This was easily removed by slight pressure directed backward, downward and forward.

That portion representing the roof of the mouth was prepared so as not to adhere to the second part of the impression, but with guides, so that the two parts could easily be fitted together. It was then returned to its position in the mouth, and the second part of the impression taken in plaster, as an impression is taken in orthodontia.

After hardening, all parts were removed, placed together in their proper relation, and a model made.

A second impression and model are necessary for the swaging of the metal plate.

Gold was used in this case, but silver or platinum could be used when advisable. It could also be constructed entirely of hard rubber, but for strength and thinness a metal plate is desirable.

The cleft in the model is filled in, dies are made, and the plate swaged, to cover the hard palate only. Clasps to go about the teeth are attached to the plate on either side, giving a firm attachment for the plate. To the nasal surface of the plate covering the cleft, four metal loops are soldered, for the attachment of the hard rubber reproduction of the lost bony tissue.

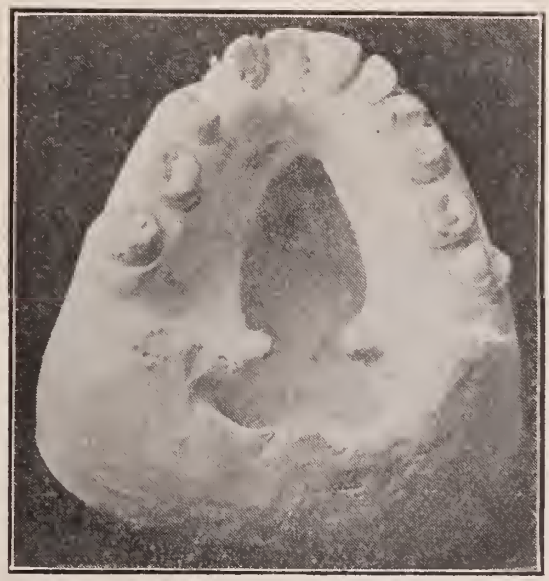

Fig. 5

With baseplate wax an artificial vomer was formed in the model. Its upper margin was closely adapted to the remnants of the septum. Its lower margin was adapted to the upper or nasal surface of the metal plate. This lower margin was spread out and thickened to replace the lost tissues of the hard palate.

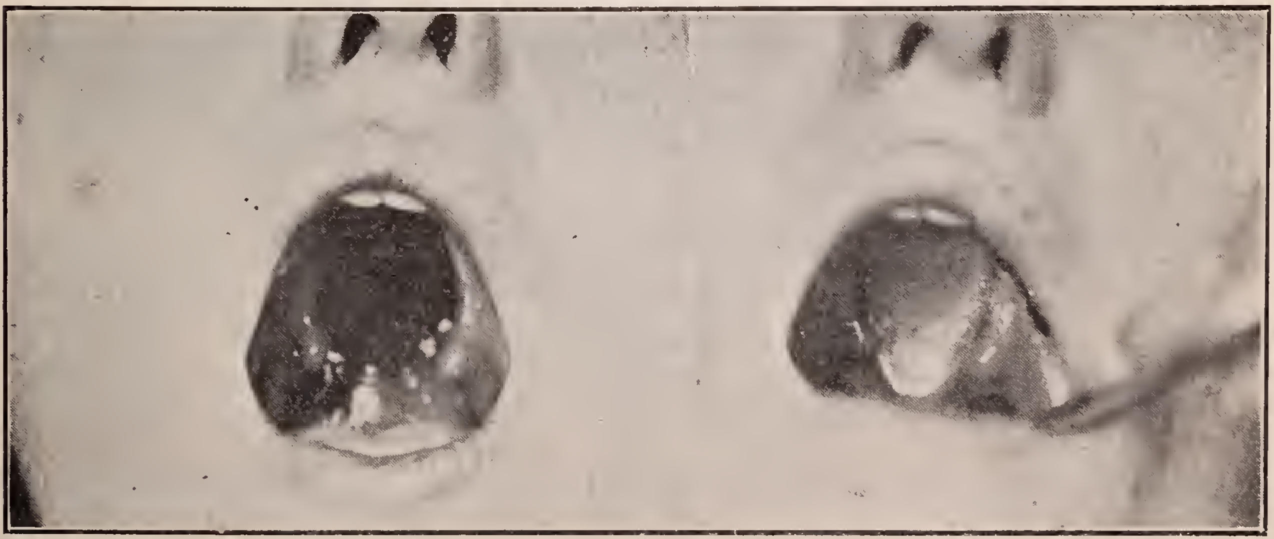

Fig. 6 Fig. 7

This was tried in the mouth to be sure of its close adaptation to the tissues.

After imbedding in the wax, at the posterior border, that portion of the hinge intended for this part of the appliance, it was flasked and reproduced in hard rubber.

The next step is to close the cleft in the soft palate with something that will stay in position and keep the cleft closed during the muscular movements of the palatal tissue. A piece of baseplate wax was doubled and shaped to fit the cleft snugly from side to side. This forms the roof of the mouth and the floor of the nasal passages. It widens out as it extends backward, forming a flange on either side. This flange laps over the upper edges of the palatal tissue.

The other part of the hinge is imbedded in the anterior portion of the piece which is to close the cleft in the soft palate. The piece for the soft palate is then attached to the plate by putting the pin through both parts of the hinge. The whole appliance in this stage is then placed in position in the mouth. By careful trimming or adding the wax of the soft palate piece is given proper shape.

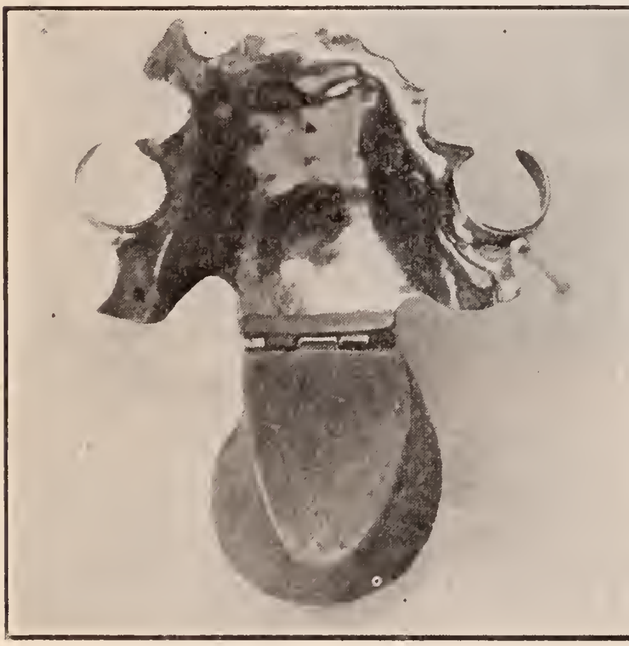

Fig. 8

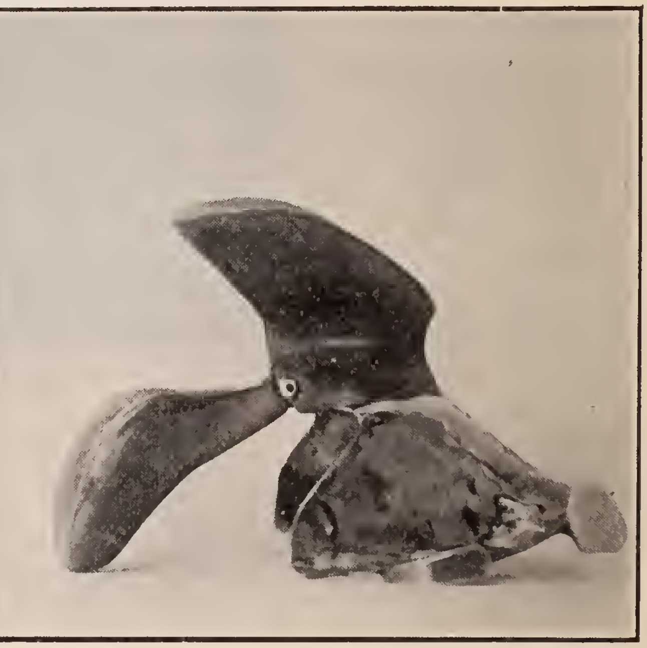

Fig. 9

It must extend back sufficiently and be so shaped that when raised by the muscles in the act of swallowing, it will touch the posterior wall of the pharynx so as to close the passage into the nasal cavity. This part is then reproduced in hard rubber, faced with pink, to more resemble the palatal tissues.

Being solid, it has sufficient weight to keep it in position when the palate muscles are relaxed, and still is not too heavy for them to raise when contracting. This movement is possible owing to the hinge joint. The whole appliance, constructed of metal and hard rubber, is perfectly hygienic and non-irritating to the tissues.

Figures VIII. and IX. are two views of the appliance, While this appliance will help to restore normal function, education is necessary to improve speech, owing to the fact that the patient being unable to make sounds in the normal way through the lack of these parts, it has been necessary for her to bring to her aid other tissues or parts in the attempt to produce the various sounds. Thus habits have been formed which it is necessary and hard to overcome; but with this appliance and the co-operation and persistence of the patient these difficulties can be overcome.

### DEMONSTRATION.

Miss K.'s appliance, as you see, is constructed as I have described. (*Show Appliance*).

*Without the aid of her appliance* I shall ask her to pronounce some of the most difficult letters of the alphabet:

First—The Labials—B-P-F-V.

The Anterior Lingual Palatals—C-D-S-T.

The Posterior Lingual Palatals—G-K-Q and X-Y-Z.

Now an awkward combination, such as "Sixty-six."

And a still harder combination, the name of Dr. Norman W. Kingsley.

*With her appliance in the mouth* she will repeat this combination, which I think will demonstrate to you a very marked change in the quality of her voice, her articulation and enunciation. (*Miss K. repeats the above*).

To show that when the palate is raised by the muscles, the nasal passages are closed, and the breath may be forcibly expelled through the mouth, I shall ask Miss K. to blow out this candle. (*Blows*). This may seem a very simple matter, but I assure you that she was not able to do this before the introduction of this appliance, and now you see she is a pretty good *blower!*

### BLOCK TURBINATES WITH WAX.

Most appliances that are constructed at the present time are bulbous, or of the plug type, which necessarily interferes with the nasal resonance, the appliance more or less filling up these resonance cavities. To show how absolutely important it is to have the nasal passages restored to as nearly as possible a normal condition, I shall add a piece of wax to either side of the vomer bone (of the appliance), completely closing off the nasal passages, showing the interference of nasal resonance.

To demonstrate this Miss K. will say: *NEE-NAH-NOH* and *ING-N-M*, with and without the obstruction.

### SINGING DEMONSTRATION.

Now to see what is possible with the singing voice, we will be assisted by Miss K.'s vocal teacher.

Through the development of her breath control, and by a unique *card buzzing exercise* used in vocal art science, to develop certain phases of the voice, she is now able to blow a steady flow of breath through the lips, and she will open her singing demonstration by a little exercise in card buzzing, to show breath control. (*Buzz Card*).

Next, the scale of thirteen vowels and thirteen consonants will be used. These scales have been arranged so discriminatively in their sequence in "Vocal Art Science" that by their correct use each and every resonator from the tip of the nose to the epiglottis is exercised, and finally all are correlated.

With the use of the scale of consonants and vowels all muscles for articulation and enunciation, namely, the lips, tongue and palate are exercised and developed, and perfect *pronunciation* is the result.

Miss K. will demonstrate the above combination—first to show her breath control and tone quality, she will sustain the thirteen vowels at three or four different pitches.

Then to show *her* use of the scale of thirteen consonants and vowels she will sing them on chromatic scales, and reverse the order on descending.

(*Miss K. sings scales of thirteen vowels and consonants*).

To demonstrate the practical use of the mechanical appliance in showing the foremost and highest nasal resonance, she will sustain the combination of Ing-N-M, and will prolong the sound of *M* to show its position in the singing quality.

(*Miss K. sings ING-N-M*).

To demonstrate the perfect mechanical action of the appliance she will sing an arpeggio that moves from a lower to a higher pitch in the ascension. This necessitates a rise and fall of the normal palate and is perfectly apparent with the artificial palate. (*Sings Arpeggios*).

Miss K. will finish her demonstration by singing two ballads. This is to show the combination of articulation, enunciation, pronunciation, and also the legato in singing. The latter necessitates perfect breath resistance against the upper incisors, which again is made possible by the mechanical appliance.

Let me state in conclusion that Miss K., in the training of her singing voice and perfecting of her articulation and enunciation, has had only twenty lessons thus far.

(*Miss K. sings two songs*).

23 W. 36th St., New York.

## ABSTRACT OF DISCUSSION.

In discussing Dr. Mitchell's paper, Dr. Bogue said that it was well known to some of the profession that he came to New York originally to take charge of the practice of Dr. Norman W. Kingsley. This, Dr. Bogue said, had caused him to become acquainted with quite a number of gentlemen who had busied themselves in the manufacture of artificial vela: Suersen, of Berlin; Williams, of London; Hitchcock and Baker, of Boston; Preterre, of Paris, etc., but that he had never seen so strikingly good a result coming from any of them.

Dr. Davenport, of the Carnegie Institution, says that in general cleft palate is inherited, or that heredity plays an important part in its production.

Surgical closure of the cleft would, indeed, be the ideal method of treatment if function could be restored, but unless taken very early in life it seldom is restored.

Dr. Brophy claims that there is generally no lack of tissue in these cases, and that when the two halves of the upper maxillary are brought together the upper teeth develop and occlude fairly well with the lower.

Dr. Brown, on the other hand, finds frequent use for a screw to spread the upper maxillary after early operation for cleft palate involving fracture of the upper maxillary bones. Whether closing the cleft at a very early age would be judicious practice, if one felt fairly certain that the upper teeth and alveoli would later on have to be spread again in order to occlude with the lower teeth, needs more study than I have been able to give it to decide.

The present apparatus (Dr. Mitchell's appliance) differs from those which I have thus far seen in two essential particulars. An effort has been made in this instance to restore the vomer, and this is, so far as I know, a new feature. It seems to have been so successful that resonance of the voice has been attained to a degree far in advance of any appliance that I know of. Usually there is a thickness of utterance, which is quite perceptible, but in this case there is an admirable getting back to natural conditions, so that the performance of function seems possible. When the possibility of the performance of function is reached, the efforts of the patient alone can procure that performance. When mere plugs, however, are made as obturators the effect on the voice is a muffling of the tones. The reproduction of the resonant vomer, even though it be done artificially, helps to give a resonant quality to the voice.

This apparatus is entirely made of hard rubber and gold, so that its durability is far greater than any of the appliances made of soft rubber, or velum rubber, so called.

I wish most heartily to congratulate Dr. Mitchell on the success of his work, and to thank his young lady patient for her kindness in allowing us to both see and hear the admirable results that have been attained. I think the young lady teacher also is deserving of great credit for her share in the splendid results.

Frank E. Miller, MD., M.A.: During thirty years of active practice, I have seen and analyzed about thirty cases of cleft palate, which revealed, on inquiry, that in the mother's pregnancy, especially the first three months of this period, there was an aversion to foods, as a result of gastric and intestinal indigestion, usually of long standing; there was also a history of catarrhal conditions. There was the usual reflex and reciprocal nasal catarrh, affecting the turbinates, middle and inferior, with mucous discharges running over membranes dominated by stomach and digestive processes. Every one of these cases had nervous shocks. In conjunction with these observations it is well to note:

Perforation and development of anus at sixth and seventh week in embryo; perforation of blastodermic layer into the mouth, sixth to seventh week; perforation of iris in eyelids, sixth to seventh week.

At birth, the fact that automatic action is the principal one, is shown by the following facts:

Respiration is imperfect; skin takes its place; heat is not actively generated; few manifestations of intelligence or perception; special senses unexcitable; consciousness limited; voluntary motion and sensation almost absent; irregular movements showing activity are mainly automatic.

Result of reflex nerve explosion, such as: motions of hands, feet, sucking, cries, contortion of face; they do not indicate active volition, and there is little connection of the system with the outside world.

Its principal activities with its own nervous system, nutrition and respiration, all of which are automatic.

Again, in Voice Culture, it is a most significant fact that voice appears and disappears with the teeth—the members of our body that dentists control. The beginning of voice is generally announced by the shrieking ''ki yhi,'' with nerve explosion, or the contentment of mellifluous ''goo-goo.'' After the gentle lacteal spell, comes the progressive appreciation of resonantic ''ma ma,'' or articulatory ''pa pa,'' and whether it be resonantic or articulatory, gutteral or palatal, the subtle palate is automatically co ordinating these nervous outbreaks into expressive speech.

The keystone of our phonetic arch is the palate.

The subtle palate divides taste from smell and separates articulation from resonance, and with equal subtility, differentiates, and at the same time transmits the fundamental voice into overtone or falsetto; makes it possible to transform fundamental tone of the cords into vowel voice, specifically as well as arbitrarily, for a vowel could not be made to exist unless its own fundamental was super-imposed and made synchronous with fundamental cordal voice, neither could a falsetto voice be established without the soft palate, which regulates the arch or hard palate, also dome or post-nasal cavity for the reception and dominance of its own tone. The arch or hard palate is fringed with teeth; without these teeth clear, incisive and definite speech could not be had. The teeth of the lower jaw precede those of the upper about a month, therefore, they should regulate (by priority of eruption) the upper. By priority of development of the same organs, of which you, as dentists, are the sacred guardians and final masters—the first and greatest element to enter into the adjustment of vocal resonators is established; namely, articulation and first reinforcing resonators of the voice, the dental or palatal arch. Subtle as has been our former palatal action, still more subtle from this side of argument, when we consider that the first twelve teeth of the lower jaw and their white, staunch, and dependable mates in the upper or dental arch are the same in number as the resonators of the human voice.

Quite as marvelous is the fact that the soft palate controls also the second overtone of the voice, namely, the specific power of controlling the dome or post-nasal space of the pharynx. That is, a power of so adjusting it, as a valve to a wet resonator, that the second octave of our tone is accurately caught and controlled, for when the soft palate is shut off the Koenig flame shows no wave forms for that region, but when opened, the wave forms are present.

The remarkable thing about Dr. Mitchell's wonderful mechanical appliance is that he has fitted it so accurately that Miss K. can close off the space as no person that I have seen operated on, or obturators made for, could do. She can cut off the air perfectly (the mechanism is so true), and up to the present moment, he has the premiere results to place *him* at the head of this line of dental and phonetic work.

H. J. KAUFFER, D.D.S.: I have listened with interest to Dr. Mitchell's paper; above all I am impressed with the practical demonstration of his work. Dr. Mitchell is to be congratulated upon the results which he has obtained. I have never before observed as perfect restoration of speech by means of prosthesis in the mouths of any of these unfortunates.

I do not agree with the essayist that prosthesis has any advantage over plastic surgery except in inoperable cases. I claim that the majority of failures in staphylorraphy are due to the fact that an impossible operation is attempted.

I speak with knowledge when I assert that staphylorraphy when properly performed restores all functional activity to the parts. Where the patient is seen early enough and the cleft palate is not of an inoperable type, almost perfect speech follows.

It is a great comfort to know that through the dexterity of Dr. Mitchell such good results can be obtained with prosthesis. In the future all cases of cleft palate which come under my observation of an inoperable type I will refer to Dr. Mitchell.

**Losing the spirit of youth, and not the passing of the years, brings age.**

# A CONSIDERATION OF PAINLESS FADS.*

BY H. C. SEXTON, D.D.S., SHELBYVILLE, IND.

THAT MOST of our knowledge of life comes from experience, personal experience, we will all grant; but at what a terrible waste. Experience is not a teacher who follows after the modern method of the gilded pill, but rather is she one of the old school, who teaches to the accompaniment of the hickory stick, that at times becomes a full-fledged club. Her lessons are administered by a series of hard whacks that the pupil is expected to interpret for himself. She only tells us when something goes wrong, so her instruction is, after all, merely negative. The interpretation lies entirely with us, and, good or bad, we must reap as we interpret.

It is wonderful to how many miserable excuses we idealists will give ear rather than to come frankly out and acknowledge ourselves mistaken. We bicker and argue with experience in a most stubborn way and the inevitable result is always the same—another whack over the head from the hickory stick.

Some of us treat experience in much the same way that Don Quixote treated the basin he supposed was Mambrino's enchanted helmet, while others of us assume toward experience the typical attitude of Sancho Panza.

''That is not a helmet,'' asserted Sancho Panza, ''it is merely a barber's basin.''

''I will admit,'' said Quixote, ''that it looks very much like a barber's basin, but that must be because some ignorant man has put it to ignoble uses. To those who know what it really is, the present appearance does not matter. Undoubtedly it is Mambrino's enchanted helmet, and as such I shall wear it.''

And wear it the Don did with some very remarkable results, as all readers of Cervantes know.

The natural corrective of Quixotism is Sancho Panzaism. or, in other words, the common sense interpretation of experience. We should all, in self-defense, learn the lesson, for only by its learning can we reap the full benefit of the hickory stick and thus overcome the tendency to be forever seeing Mambrino's enchanted helmet in every barber's basin we meet. The subject I have chosen to consider in all its Quixotism, and with all the Sancho Panzaism I am caple of applying to it, is Painless Dentistry.

As an introduction I shall tell a story, if you will allow me to tell it, in the form of a fable.

Once upon a time (that is the honored beginning, you know, and we shall not depart from it). Once upon a time there was an enthusiastic youth just entering upon the practice of dentistry whose soul was filled with a longing to be more than just an ordinary dentist. He longed to solve great problems and introduce new methods that would revolutionize the old staid rules of practice. Especially was he anxious to find the divine elixir that should relieve all pain and make of the practice of dentistry a roseate path of flowers.

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*Read before the Odontological Society of Western Pennsylvania, 1913.

Now about this time there came forth from a city in the northwest a proclamation unto all dental land that a man dwelt therein who had discovered the secret of painless dentistry, which secret he would impart for the truly insignificant sum of one hundred dollars to the first person in each locality who should apply.

The young idealist was interested at once, but not entirely devoid of Sancho Panzaism, he wrote numerous letters to others over the country who had bought the secret of the discoverer in the northwest. The replies were all very flattering to the new method. Every one in accord pronounced it the most marvelous improvement that had blessed the profession in many a year. Still did the young man not throw all caution to the winds, but he resolved to travel into the northwest and investigate this wonderful discovery at its very fountain head.

So accordingly one cold winter morning he dropped into the enchanted palace of the discoverer and asked permission to tarry there a few days. This was graciously accorded him.

His first experience lay in watching an operator obtund a cavity in the distal surface of a central. After the dam was adjusted a double bulb air syringe was heated, some medicine placed upon cotton within a chamber in the metal part of the syringe, and the warm vapor blown into the cavity. After a few minutes the excavation took place without pain. When the filling was completed the patient was asked about Dr. H.'s Method of Painless Filling and gave forth most glowing words of praise.

Things about that office seemed fairly to move on oiled wheels. It was a busy place and apparently a happy one. Each patient seemed to try to excel the other in praise of the method. One thing, especially, the young man liked—there was no cutting of fees, but rather a boosting up of them. The proprietor made quite an impression by quoting him a bit of Phil Armour's philosophy: ''A fool can cut prices, but it takes brains to make a better article.''

At the close of the first day the young man succumbed to the charm, paid his hundred, and asked for full instructions.

''Well,'' said Dr H., as he put the check in his pocket, ''I will tell you in the start that I have no one way to deaden the sensitiveness of teeth, but I have many ways, and the one used depends upon circumstances. Ordinarily we use the continuous blast of warm air to dehydrate the tooth, assisting its action by various volatile agents. At other times we use electricity. In extreme cases we use nitrous oxide gas. We never let a patient suffer.''

"How do you use electricity?" asked the young man.

"I should have said we used the suggestion of electricity," replied Dr. H., smiling. "There is no current in the wires at all; we simply fasten one to the patient's wrist, hold another to her tooth for a few moments, then proceed with the work."

"You mean, then, that your electrical treatment is all fake?"

"No, sir, I wouldn't call it fake. The suggestion does wonders. We have controlled some cases by it that we would otherwise have had to give gas for. Suggestion, you know, is medicine just as much as anything else. Its power is recognized by eminent authorities. True, the patient thinks there's a current in the wires, so does a physician's patient who takes a placebo or bread pill think that it contains medicine. They each at times get excellent results, and one is no more a fake than the other. Physicians have no scruples against deceiving their patients when it is for the patients' own good, then neither should we have. With our warm air syringe and our electricity we control almost all cases. Occasionally we give gas, but we dislike to give a general anesthetic and seldom have to.

"In a business way, young man, you will coin money in your locality and please your patients as you have never pleased them before. There is one thing of the utmost importance that I want to impress deeply into your mind—it is *the secret of all financial success in painless dentistry.* The public thinks it hurts always to prepare a cavity in a tooth, in reality it hurts only about once in five times. You must take to yourself credit for the four times as well as for the one. It's the genius of good business to use your painless method on everything. Remember that."

The young man went home and began the practice of painless dentistry with considerable enthusiasm. At first the results seemed to be all that anyone could desire. His second month at it was double in receipts of any previous month he had ever had and his patients were bubbling over in their praise of him. Yet at the bottom of his heart he was uneasy. A conviction gradually stole over him that as an operator he was doing poorer and poorer work each day of his life. The desire not to cause pain made him resort to any and all expedients to that end. When the alternative was presented to him either of causing pain or of doing poor work, he invariably chose to do the poor work. He was compelled to that choice since he was obligated by all that was sacred not to cause pain.

As a consequence he cast off the whole painless business after a few months, and he did it with a great sigh of relief. He has never been proud of that period of his life, and he is firmly convinced that if he had practiced it very long he would have deteriorated in ability as an operator and in general moral fiber as a man until he would have ended in being the veriest quack alive.

Once in a while now that man will have a patient for whom it seems an impossibility to prepare the cavities in the teeth properly. Then he frankly says: "Now, if you wish I will put these fillings in without the preparation the cavities should have, but understand that if I do, then we must not expect very good results, and when bad results come the responsibility must be yours, not mine."

Generally after such a plain talk the patient will say: "Well, go ahead. I'll stand it. I want it done right." In the few cases that are still beyond his control he will do the work as good as he can under the circumstances, then, with a clear conscience, send forth his patient. Never under any circumstances does he do work in any inferior manner without telling of it. It is only common honesty to the patient and self-protection for himself.

Now, the young man of that fable I need hardly tell you was myself. And I believe my experience will be verified by the experience of all the men who in the past have tried to practice painless dentistry. Let a dentist once obligate himself to his patients not to cause them any pain, then at once that dentist ceases to do his best work. We should try by all means to do our work as painlessly as possible, that is our duty, but the right to inflict pain whenever necessary must ever remain as a safeguard to a good operator. Without it he at once begins to deteriorate. That is a natural law that is just as sure, just as inevitable as the laws of the Medes and the Persians.

Let us pursue a little further the history of attempts at painless dentistry. Cataphoresis came upon us with a great flare of trumpets. Like many other dentists, I at once bought the best outfit on the market and went at it enthusiastically. It seemed to work beautifully in some cases, but you need not be told how dismally it failed in others. The time consumed in operating it was a great objection even when successful. In a year or so everybody was trying to sell cataphoric outfits. But you couldn't even trade them for yellow dogs. It would be well were there some way of telling just how much money the cataphoric craze cost the dentists of America. It must have put quite a fortune into the pockets of the manufacturers.

And after cataphoresis came the high pressure syringe with its crop of dead pulps, and so it went its way.

And similarly went the chloride of ethyl sprays. Undoubtedly you can anesthetize a tooth with a spray so that you can painlessly prepare a cavity, but in anesthetizing it you will hurt your patient a dozen times what the preparation of the cavity would hurt without it.

To the ethyl sprays the same objection can be urged that can be urged to the use of a club. It is not that they are not efficacious. With a club or with a spray you can prepare any cavity painlessly, but the soft lives people live in this age render either method objectionable. We have passed the club age.

In all the remedies that have come to us in the last two generations for the relief of pain in dental operations there is only one that has not disappointed us—cocain. With it we can extract with little or no pain, and when we have an exposure into the pulp we can remove that pulp painlessly. Those are wonderful methods that make cocain a blessing to humanity, but it does not help one iota in preparing a cavity where there is no exposure—more's the pity.

But still the Don Quixotes go on their adventurous wanderings through all the air, the earth beneath, and the water that is under the earth in their search for the magic helmet of Mambrino that shall cure all dental pain. And plodding along after—usually a year or two after—come the Sancho Panzas with their plain old plebeian common sense, pointing out that the supposed magic helmets are in reality only barber's basins of brass. I, who have long been a Quixote, have now joined the ranks of the Sancho Panzas. In regard to magic helmets I am, albeit a Hoosier, always from Missouri.

In the last few years we have witnessed quite a revival of the use of nitrous oxide and nitrous oxide and oxygen $N_2O$ and for the painless preparation of cavities by analgesia. As has already been stated nitrous oxide has been given a trial in years past for cavity preparation and generally discarded. The objections were found in practice to more than counterbalance the advantages. Those who have now revived its use in combination with oxygen claim to have overcome those objections. Let us examine their claim.

The one great objection to the use of nitrous oxide in any combination is its danger. People have been killed by nitrous oxide. If it is going to be used generally for the preparation of cavities more people are going to be killed. Just this last winter, in the office of a friend of mine in Indianapolis, Dr. H. M. Thomson, occurred a collapse from gas administered for an extraction. Let me read you an account of the case as reported by Dr. Arthur E. Guedel, an expert anesthetist and a specialist in administering nitrous oxide and oxygen.

"Mrs. X, aged 35; operation, extraction of a tooth. Patient apparently good anesthetic risk, but somewhat apprehensive of the pain of the operation. She expressed no fear of the anesthetic, and when the attendant applied the inhaler she began to breathe deeply and rapidly, making an effort to go to sleep quickly. The anesthetist had the apparatus adjusted to deliver pure gas, but he did not notice that one valve was not closing properly, thereby delivering large quantities of air with the gas. The patient continued the deep, rapid breathing for several minutes, and by her respiratory efforts, together with her increasing anxiety at not becoming anesthetized, her heart was whipped up to an extremely rapid rate; at the same time she was exhausting the $CO_2$ from her blood more rapidly than it was being supplied. Then at a time when she was almost exhausted, the open valve closed, suddenly giving her pure gas. She was very suddenly anesthetized, the mask being held in place until she was quite cyanotic. The condition came on very rapidly, as the anesthetist said—in four or five respirations.

"The operation was completed and recovery from the anesthetic was complete. The patient showed no unusual manifestations, and after a few minutes was permitted to get up. She collapsed immediately upon the assumption of the upright position. Respiration ceased, pulse imperceptible, color livid, complete muscular relaxation, and general appearance very bad.

"She was placed in a recumbent position with her head down. Digitalis and strychnine were given hypodermically. Artificial respiration by Sylvester method until breathing was re-established. She recovered in three hours sufficiently to be removed to a hospital, where she remained one week before being well enough to be taken home. Eventual recovery.

"The explanation of the accident is this: First, the patient had a myocardial lesion, unknown to the anesthetist. Rapid, deep breathing, plus excitement and anxiety for a number of minutes had brought about a condition of near exhaustion. With the sudden admittance of pure nitrous oxide she was quickly and deeply anesthetized. The blood pressure rise was great and rapid and the heart, weakened by disease and fatigue, suddenly dilated. The dilation, however, was not sufficient to manifest itself until the patient assumed an upright position, when this added strain caused a further dilation with collapse of the patient."

Of course we are not supposed to give anesthetics to persons with heart trouble, but how are you going to know? Very often the patient is himself unaware of the condition and the average dentist is incapable of diagnosing it. If these dangerous cases went around with a tag on them, all would be well, but they do not. In the above case Dr. Thomson tells me the patient knew she had heart trouble, at one time she had dropped into unconsciousness for half an hour merely from over-excitement. Yet when he asked her if she was free from heart trouble she assured him she was—lied about it because she was afraid of being hurt and had resolved to take the gas at all risks.

Now some enthusiasts will say: "Oh, that was from gas alone; if oxygen had been administered with it there would have been no trouble." I think it would have made no difference. And as for giving oxygen after the collapse—how can you give it to a person who is not breathing?

Other enthusiasts will say: "But that trouble arose from anesthesia; it would not have occurred in analgesia." They may be right, they may not be. In my school days I was taught that the greatest danger in any anesthetic lay in the earlier administrative stages. Moreover, analgesia does not answer the purpose except in cavities that are only slightly sensitive. When a real bad one comes along they all resort to anesthesia. In my opinion analgesia is about seventy-five per cent. suggestion, and suggestion, you know, is not of much account in real pain.

Dr. C. F. Stowe, who has charge of the administration of anesthetics in the Northwestern University Dental School of Chicago, Ill., said recently: "A dentist who gives nitrous oxide and oxygen should have due regard to the danger. To say to the patient that there is absolutely no danger would be to set aside all of the opinions of men who have made anesthetics a large study. There is danger in every anesthetic."

In an essay on this subject by Dr. E. S. Barber, of Chicago, some months ago, he claimed in one paragraph there was no danger in nitrous oxide and oxygen. But a little further along he said: "The dentist should always be prepared for an emergency by having a hypodermic syringe charged with a solution of about 1-30 gr. strychnine, tongue forceps, mouth gag, brandy and ammonia ready for instant use."

Henry David Thoreau says: "Some circumstantial evidence is very strong, as, for instance, when you find a trout in the milk." It seemed to me I had found a trout in Dr. Barber's milk, and in the discussion I called his attention to it, but he had no explanation to make. "Consistency, thou art a jewel."

But Dr. Barber is not alone in claiming immunity from danger for nitrous oxide and oxygen anesthesia. All the enthusiasts claim that with more or less emphasis. But events in the dental world do not endorse their claims. For instance, we have in this current month's *Dental Cosmos* the report of a death in Berlin from the inhalation of nitrous oxide and oxygen. It is too bad that men will continue to die from that cause in spite of beautiful theories to the effect that those gases administered together are free from danger, but such is the perversity of things in this world for our friends, the Don Quixotes.

Besides actual danger there are other minor objections to the extensive use of nitrous oxide about the dental office. Hysteria is not infrequent and is a most unpleasant complication. Nausea we have equally as often, and it is equally as unpleasant.

Dr. E. I. McKesson, an anesthetist of Toledo, Ohio, says: "The preparation of a patient for nitrous oxide analgesia should be: Abstinence from food for at least three hours previous; emptying of the bladder, loosening of all tight clothing, corsets, etc."

Now I think that obtaining those conditions is not impossible, but in a general practice it would be most inconvenient and often embarrassing. I am sure that I would not care to tell every lady for whom I filled teeth that she must first empty her bladder and loosen her corsets, nor would it always be convenient to have her on an empty stomach. Those precautions are, of course, important in giving any anesthetic, but the fulfilling of them in a general practice has its objections.

Another objection to the administration of nitrous oxide and oxygen for either analgesia or anesthesia is its cost.

Dr. Stowe says: "To administer nitrous oxide for analgesic purposes for one hour at an average rate of eighteen respirations per minute you will consume one hundred thirty gallons nitrous oxide. Provided you use one hundred gallons nitrous oxide and forty gallons oxygen, unless you purchase it in large quantities, it will cost you four dollars an hour. If you use equal quantities of nitrous oxide and oxygen it will cost you four dollars fifty-five cents per hour."

Another estimate of the cost of administering nitrous oxide and oxygen is given in the last August SUMMARY by Dr. W. I. Jones, of Columbus, Ohio. He says: "In anesthesia lasting one hour using cold gas two hundred fifty gallons nitrous oxide will be consumed and forty to fifty gallons of oxygen. If the gas is warmed you will use one hundred gallons less." According to this estimate the cold nitrous oxide and oxygen for an hour will cost six dollars twenty-five cents.

Of course the preparation of one cavity does not consume an hour, but many of them consume fifteen or twenty minutes. For that time the expense of nitrous oxide and oxygen would be $1.25 to $1.50, which would be enough to forbid its use generally.

Still another objection to the use of nitrous oxide and oxygen in the preparation of cavities is the fact that the feeling of the patient is often the only guide we have to go by as to the location of the pulp. A cavity prepared under anesthesia, in this day of sacrifice of tooth substance for ideal preparation, is apt to be cut too near the pulp, thus entailing after trouble. The criticism is made that an operator, if he be up on dental anatomy, will know where the pulp is without trusting to the sensitiveness. That is true generally, but not always. There are abnormal shapes to some pulps just as there are abnormal shapes to the exterior of some teeth. You can never tell to within a fraction of a millimeter just where the horn of a pulp is going to run. Thus we see that sensitiveness in cavity preparation often serves a good purpose. If we temporarily put it out of commission we sometimes create after complications that are far from pleasant either to patient or dentist.

One bit of sophistry which is urged upon the dentist by the advocates of nitrous oxide and oxygen is very amusing to us Sancho Panzas. We are told we should use the anesthetic in order to lessen the strain of practice upon us so as to avoid nervous breakdowns. In reality the shoe is on the other foot. It is most foolish to think that the strain upon the dentist is lightened by throwing upon him the additional responsibilities of the anesthetist. On the same principle when Pat complained that his hod was made too heavy by an overload of bricks we would pile on a few more and then assure him that he would feel great relief for the change. This is Quixotism run riot. Surely it is time we Sancho Panzas should speak out.

In regard to the Don Quixotes of today I want to point out one very significant circumstance—a very black nigger in the woodpile. The generals of the Analgesic Army and all the loud players of wind instruments in the military band are men who are either giving post-graduate courses in the use of nitrous oxide and oxygen or else engaged in the manufacture of new apparatus for the purpose of administering those gases. That these generals and their musicians are honest I am not disposed to dispute, but if their interested advocacy were suddenly withdrawn the whole movement would collapse, possibly from dilation of the heart. It would be about like sticking a pin in a balloon. This blowout is bound to come.

> "The great laws of life readjust their infraction
> And to every emotion appoint a reaction."

The trouble with all faddists is that they are like Rabelais' man who spent all his life in a barrel and only looked out at the bunghole. They can see nothing but those things that are within the range of that bunghole. All the rest of the universe is to them non-existent. And when they see a goose the lack of perspective is very apt to make it look like a swan.

We should not judge a fad solely by the amount of noise made over it. The silly hen will cackle as much over a chalk egg as over a good one. To administer remedial medicine to a faddist is useless. It is like giving medicine to the dead. Time, the great healer Time, can alone work his cure. I know because I speak from experience. I have been there. I have lived in the barrel and looked out at the bunghole; I have seen the goose and mistaken it for a swan; I have cackled over chalk eggs and I have refused good medicine looking toward my recovery. I am not throwing bricks at any one. I am merely making my confession of past experiences and stating my creed for the future.

That there is a field in dentistry for the use of nitrous oxide and oxygen I do not deny, but the field is a small one. Instead of the great new continent that many are pointing out to us I can see only a modest sized pasture lot, and most of that lot has been occupied for a generation. Nitrous oxide and oxygen may possibly be given to some extent in the future for the preparation of cavities, but if it is used for that purpose, it should be administered by a specialist, a trained diagnostician and a trained anesthetist. This eligible man may be a dentist, in fact he may more suitably be a dentist than a physician, but he will not be the average dentist in general practice. The average dentist is not justified in putting his patient in danger by a general anesthetic for cavity preparation. The small end does not justify the dangerous means.

In view of the history of painless dentistry we are warranted in looking with suspicion upon all innovations proposed for that purpose. The effort to avoid pain is a worthy effort in which we must persevere, but at the same time we must remember that in the pursuit of the magic helmet of Mambrino we have brought many evils upon ourselves.

To avoid a repetition of those evils in the future we must be more conservative; we must apply to our problem the advice of Pope in his "Essay on Criticism."

"In words as fashions the same rule will hold
Alike fantastic if too new or old;
Be not the first by whom the new are tried
Nor yet the last to lay the old aside."

### DISCUSSION.

**Dr. O. L. Hertig:** One thing which often impresses me is the variety in the manifestations of human nature. Another thing is the various stands taken by the members of the profession in regard to some one thing, and what makes these stands possible is the various conditions which attend the various operators in their work. Your practice is not mine, and my practice is not the practice of my next door neighbor. This seems strange, as one would think, upon analysis, that there would be sufficient repetition of the elements involved to make a certain stand absolute. But such is not the case. Human nature is ever variable. I take the stand today in favor of analgesia, and against analgesia, and this is not paradoxical at all. I simply mean to say that in the field of the profession today it is a fact that 90% of us do not use good judgment in electing what to do and when to do it. We are like a flock of sheep, of whom, when their leader jumps over the fence, 90% follow him; 90% of us are like 90% of the sheep, but there are some like the old buck, who was wise and went around the stump. I have used a tin pan for a helment *a la Don Quixote*, and I have likewise ridden the mule and followed in service of the knight errant. I have been on both sides and I will take the stand in favor of humanitarian dentistry. It does not mean the practicing of analgesia or anesthesia altogether, but simply a combination of common sense, dexterity and skill, and the correct psychological effect on the patient from the time he gets into the chair until he leaves it. This brings us to the subject of control of the patient. This item applies to the operator himself. One man has within him the dominant spirit which makes the patient quiet through fear; another man has within him just as dominant a spirit, but one which is sweetened with sympathy. His patient co-operates with him, and this is what we want—co-operation on the patient's part and tact on the part of the operator. Those who have the handling of little children will appreciate what I mean by tact. If you can get a child to come to you before having been scared by foolish mothers, more foolish old maid aunts and grandmothers, and more foolish still, that apex of asininity, the maidservant, you have a fair chance of educating that child to be a good patient, and one for whom, at the age of 18, you can perform any kind of operation. If the operator of today, when a neurasthenic patient, or one entirely neglectful of mouth hygiene, comes into his office, instead of figuring out a total and boosting up his bill, would figure out how he could encourage the patient to get his mouth into good condition and appreciate his teeth, he could, by the use of prophylaxis and a little good judgment, unalloyed with the element of greed, get good results. Suggestion does play a part. The current which flows from the operator to the patient and carries confidence and sympathy is largely made up of suggestion, plus what? Let us see. The man who knows how to use a dental bur and follows his knowledge of the enamel, does not burrow downward; the man who knows how to use a chisel does not throw his patient into a state of hysteria by knocking a hard blow with it; but with the least application of force and the least infliction of pain, accomplishes the greatest results. Those men out west, of whom Dr. Sexton spoke, who are able to do such stupendous operations without the use of anesthesia, etc., all have studied cavity preparation, and that does not only mean the preparing and shaping of the various parts of the cavity, but it means the economic use of the cutting instruments employed in that preparation. There are many things in favor of analgesia. There are some patients so obsessed by fear that we have to use it. For my part, I am going to have an analgesic outfit in my office and am going to try to exercise judgment in using it. In conclusion, let us cultivate the spirit of sympathy, which gives our patients confidence, a firmness which cannot be denied, and a dominant attitude which goes hand-in-hand with compassion and gentleness. Let us cultivate a proper judgment in technique, aiming at a minimum of force with a maximum of results.

**Dr. W. W. Booth:** Dr. Sexton has given us a very good paper, and it gives us plenty of room for discussion on both sides. He has mentioned cataphoresis and different things, down to cocain, nitrous oxide and suggestion. Suggestion has a great deal to do with it. We can give Dr. Sexton a lot of credit for his convictions in coming into this territory where nitrous oxide is getting a stronghold, and telling us of his experience with it, and it will probably do a great deal of good in making us careful. I do not think there is the danger with it, as we would use it, as he would lead us to believe. I think there are many cases in nitrous oxide work in cutting out cavities where there would be no danger with it at all. We would have ample signs in the patient to give us good warning of any danger. In many a case of very nervous patients, especially with young girls, I think there may be a great deal more harm done by cutting a very sensitive cavity than by using nitrous oxide. The chances for doing harm would be a great deal less, as the shock caused by excessive cutting is more than one would imagine. My own sister-in-law, before the use of nitrous oxide was attempted, would sit in the chair with the courage of any Spartan and take all sorts of punishment without a word, then go home and go to bed for days. She is probably the most difficult patient I have today and I got relief in that case by using nitrous oxide. Dr. Sexton, in speaking of the danger with it, says there is no way of getting oxygen into a patient after the collapse. If there is no respiration, how are you going to get it in? Dr. Terry, of Cleveland, gets credit for what is called the "oxygen shock." The exhaling valve is closed and the bag is filled and made as tight as possible, and thus you can force oxygen into the patient's lung, and no matter whether he is breathing or not, you can give the oxygen shock which will very often start respiration. In our work of analgesia, it would be just as much a crime to cut a sensitive tooth without giving the patient something as it would be for a surgeon to cut off a finger without giving something to deaden the pain. In cases of deep anesthesia that requires some time for operation, I believe in telling the patient that there is no danger and telling a third party (a member of the family) of the danger connected with it. That is where suggestion comes in well. As to the cost, I think that is a minor consideration. Dr. Sexton's estimate is about right. In my experience, I have had no trouble in telling the patient that I would have to charge extra for the nitrous oxide, and in one hour's time you can do a great deal more work with it than without it. There is always danger with it in exposing the pulp in deep cavities, but if the decay goes down to the exposed pulp, it is better to remove it than to try to fill over it. Dr. Sexton has given us a very good paper and one that will make us think of the dangers, as well as the good we may get from it.

**C. E. Peters:** I was compelled to miss some of the very interesting clinics this morning in order to read Dr. Sexton's paper, and see what I might scare up that would be antagonistic.

As he is from the Hoosier state, I feel gratified that I may discuss his paper, because I once was a Hoosier myself. My Hoosier friend has treated his subject in a very interesting way, and has proven his ability to express himself in beautiful English. However, after having read his paper, in my opinion, the title might better have been named—"A Consideration of Painless Extremists and Pretenders"—as he assumes that those who make use of any of the so-called fads, must necessarily use them in the manner advised in his story of "Dr. H.'s Painless Method," viz., that it is good business to use your painless method on everything, thereby taking credit for producing results which may be 75% fake. The young man of the fable took this advice home with him and started his career anew, with the resolve to inflict no pain in his work. This was the point at which he fell a victim to the hickory stick. He was a determined Don Quixote, had he retained some of the Panzaism which he took with him to the northwest, and applied moderate doses of it occasionally in his career of painless fads, carrying it along right up to our present fads, he might finally have attained a beautiful balance in his opinions of the present painless aids to dentistry, instead of being a downright pessimist.

Why does he have this opinion of the subject? Probably because he has had experience with the obsolete 99% suggestion methods of the electric battery, or cataphoresis with its tedious technique and large percentage of failures, also the Ethyl chloride spray used as a club, etc., on up to the present era of Somnoform, Nitrous Oxide and Oxygen and the high pressure syringe, which we may infer from the substance of his paper, he will have nothing to do with, on account of previous failures.

In his criticism of nitrous oxide and oxygen he tells us of its danger, and cites a case of serious results—that the field of usefulness is small, that if an operation is really painful, complete anesthesia must be attained to give results.

There *is* an element of danger in the use of *any* anesthetic; people *are* being killed. At the hospitals there are fatalities from the anesthetic even in the most simple operation, but do they discontinue their use and perform their work without the aid of anesthetics, compelling the patient to endure the pain or go without the treatment because of this danger?

The case cited by Dr. Sexton in which the anesthetist overlooked the fact that the valve was out of order and not working, producing serious results, might probably be one instance in one hundred thousand. Nitrous oxide and oxygen as used at the present time is claimed by all authorities to be very much safer, and to almost entirely eliminate the dangerous factor. As we now use it for analgesia the element of danger is very slight, yet we must be safeguarded by all the means needed for an unexpected accident, even though we may not have occasion for their use once in ten thousand administrations. This is a precaution, not a proof of danger. The essayist has discarded all pain-saving agents with the exception of cocain. Is there no danger in its use? Has it not caused death very suddenly many times from dental uses? The comparison of danger between cocain and nitrous oxide and oxygen is, in my opinion, vastly in favor of the latter. Let me repeat, that for analgesia, using nitrous oxide and oxygen I firmly believe there is very little danger, especially in the hands of one having some experience, and, of course, every one, before attempting to use anesthetics, should have instructions and gain some experience, just as well as they might need instructions in any other line of work before being able to master it.

Any change from the analgesic, or semi-conscious stage, in which the patient will respond to remarks, open or close the mouth, or expectorate at your request, is very easily detected, and the amount of nitrous oxide or oxygen regulated accordingly. Those of us who use it know that a large percentage of positive results are attained. To cite an instance, a lady came to my office today, just as I had finished reading the Doctor's paper; she had a cavity in the mesial surface of an upper central, filled with soft decay; I thought here is a chance to test the Doctor's theory of no painless fads, so I started to open it up and found it extremely sensitive. I did my best with oil of clove, warm air and sharp excavators, but each time I tried to touch it she would shake and tremble all over, and I finally said, "I am afraid I will be unable to prepare this cavity properly as you cannot stand it."

She said, "Why do you not give me gas?"

"Did I ever give you gas?"

"Yes," she answered, "a year ago."

There was no other alternative. I started the nitrous oxide and oxygen and she proved to be a very favorable case, and laid her head back, and I completed the preparation with no trouble whatever. When through she said, "My, what a relief!" What would we have done without it? How can you get over that? Was the pain, and the relief of pain by the anesthetic merely an illusion?

Another case I might refer to was a lady for whom I was treating a molar, pulp dead, and when I wanted to use the engine to open up the tooth she said, "Where is the gas?"

"Oh," I said, "you do not need it, for this tooth is dead."

"Well," she replied, "you cannot grind in that tooth unless you let me have gas, as I do not want to hear that drill gritting in my tooth, which makes me hold myself in a tension and nearly exhausts me." I remonstrated, but finally had to produce; but why not, if they demand it and are willing to pay?

You may have occasional cases in which you will not meet with gratifying results. Neither does my Hoosier friend meet with success in all cases with the use of cocain. But why not have nitrous oxide and oxygen or somnoform, if you will, at hand and ready for use for a condition in which it might be indicated, and you will be surprised how often it will change the "Rocky Road to Dublin" to the smoothest macadam. I have been using nitrous oxide and oxygen in my practice for five years. I am not an extremist; I do not use it for advertising purposes; I do not guarantee to entirely eliminate all pain, but I promise the patients that it will enable them to bear the pain, if any, very easily and with no appreciable degree of nerve exhaustion. I need never mention analgesia to a patient after the first experience; they begin looking for it immediately upon sitting in the chair. I may not have occasion to use it during a whole day; again I may use it on nearly all patients another day. There may be some nerve strain upon the operator in some cases, but not half the nerve energy will be expended as there would be in those same cases were you to try to worry through the proper preparation of teeth without. In fact, there are those with whom it would be impossible to operate without it, and if you did not have the necessary means for relieving their suffering they would find the one who had.

This is an age of highly organized high-tension, nervous systems, and the day is past when you can have a practice made up entirely of the kind that can and will bear pain. Do not be a Don Quixote, but endeavor to help out some of our present day "Neurotics," many of which are to be found even in our own profession.

**Dr. Geo. T. Gregg:** I have put down a few notes at random, but the thing that impressed me most in this paper that Dr. Sexton has read today was "fear." You would, naturally, from listening to that paper, be more afraid than ever before about nitrous oxide and oxygen. It has been my experience that the big reason that men have not taken up nitrous oxide and oxygen over the country is fear, when they come right out and confess the real reason. Do not get scared at what this gentleman says. It is all right to be careful, but do not be afraid and do not pass this up. This is my advice—you can do as you please. There were two deaths mentioned here today. One was out in St. Louis, on account of carelessness, nothing else. The other was over in Berlin. About three and a half years ago I read a paper on this subject, and I have received a great many letters from all over the world in regard to it. One came from Berlin and the point in it was that "if you have such a wonderful thing over there, bring it over and show it to us—we know nothing about it." That other death was in Berlin, where they openly confess they know nothing about it. A man who sells it told me that the demand for it was so great that they could hardly supply it. When you take into consideration the amount of this gas that is used and the few deaths and the men without training that are using it, it is simply ridiculous. I will cite you another case. Dr. Teter has been using nitrous oxide and oxygen for all kinds of operations for from one minute to two and one-half hours and has never had a death. Another doctor has been using it for thirty years, and never refuses to give it to a patient who is able to walk into his office. Do not be afraid, but be careful. There is one thing I want to impress on you—look up the subject and study it, and you will find there is no reason for being afraid. I feel sorry for the man who is not using an anesthetic. I could mention a hundred occasions for its use, and one in particular. Suppose a patient comes into the office who has an inlay over the pulp which is hypersensitive, and pericimentitis has developed around it. Are you going to use cocain, or suggestion, or what? If you can relieve it in two minutes with an anesthetic you do not have to worry. I have been practicing dentistry for thirteen years, and I know anesthesia is not a fad, and I am talking for your own good. Ethyl chloride is a good anesthetic if you know how to use it. He says it causes a dozen times as much pain, and some of you may believe that. Of course, if you throw a cold spray on a sensitive cavity you will cause pain. I have killed nerves with the high pressure syringe. The old idea of saying you have to hurt to do perfect operations is nonsense. I say you can't do perfect operations if you do hurt. There are not three per cent of the patients who will stand the cutting out of a sensitive tooth as it should be done and stand the pain, neither will you inflict the pain.

Dr. Jessie DeFord, Des Moines, Iowa: It is with great pleasure that I take the floor. I used to read about Don Quixote, but I never supposed I was going to pose as that gentleman. I have practiced dentistry since 1887, and I have tried all processes possible to relieve pain. I successfully used cataphoresis and abandoned it, not because it was not a success, but because I found I was producing cerebral anaemia, and I did not think it safe. I abandoned it after I had a patient who almost became unconscious from its use. I do believe in painless processes, because when we submit the human system to greater nerve strain than it is able to bear, we are exhausting vitality, and have we the right to do that? No. As I listened to this paper, I pictured myself back in the Dark Ages, when there was no such thing as an anesthetic. Gentlemen, the chamber of horrors would be nothing compared to what this world would be without anesthetics. In the old days, when they had to amputate a leg or an arm, they would strap patients down to the table, or tie them tight, and go ahead with the work. Many people died from shock during the amputation of limbs, and we have no right, now that we know how to use anesthetics, to produce shock. Many of you men do not know all of the story. Women oftentimes submit to operations and suffer from the shock and you do not know it. The cowards are not always women in this world. Many a delicate, frail woman has gone home and gone to bed, not for a week, but for months, because some dentist has not done a painless operation. I do not think that we are warranted, in this day and age, in producing suffering more than a patient is able to bear, nor in exhausting nerve vitality. I'll tell you what you should do. You can go to tilling the soil and putting the plow into old Mother Earth,—she won't cry. That is for the man who does not want to use anesthesia—let him go back to the plow, that is where he belongs. As to the man in the barrel, who looked out of the bunghole, I don't know that it makes much difference whether he saw a goose or a swan, the whole world is so big and beautiful and bright. Is there such a thing as analgesia? When I have a very nervous patient, I use calmness and gentleness, and my sympathy and loving heart, together with a low, firm tone of voice, in the way of suggestion, until I can use anesthesia. This is where suggestion has a good place. Anesthesia is not suggestion; I do not use suggestion as an anesthetic, but only to prepare the patient for the anesthetic. I think all that analgesia does is to inhibit pain. It draws a line between the thinking capacity and the feeling capacity. It is just as if you drew a line—mind awake and body asleep and numb. It is not a fake, it is a scientific fact. The most successful patients have been business men—you can't fool them. Take a patient with the most sensitive cavities possible; produce analgesia and you have a comfortable patient. This has been scientifically demonstrated. I have had women with cervical cavities so sensitive they could not be touched and ordinarily it would take a whole morning to do the work, but I place them in my chair and use analgesia with good results. It is not a fad; it is a fact. In regard to what anesthesia does to the brain, it simply inhibits the passing of this nerve pressure (which is so great as to be pain) below the threshold of consciousness, and that is all we want. You all know how men rush into burning buildings and rescue lives, and they suffer no pain. Why? Their attention was fixed upon their mission and they were not conscious of the uncomfortable conditions surrounding them. They could be badly wounded and not know it, because they were living in their brains, not in their bodies. Christian martyrs went to the stake and suffered no pain. In some way their religious consciousness was so great that they lived in the upper story and their brains predominated and they did not realize the sufferings of their bodies. They simply divorced their minds from their bodies. Analgesia is a scientific fact, not a fad; it is demonstrable, which makes it science. Pain can be inhibited. How do we learn to walk? We do not have to think of every step. The medulla oblongata has learned to respond. It is simply a process of inhibition. Any anesthetic will do it—it is only a matter of choice of anesthetic. I have yet to see the first expression on anyone's countenance of any danger from analgesia. You can always tell if a patient is all right, and you can discontinue the treatment if he is not. Don Quixote was a Spaniard, and they are a romantic race. But there was one Don Quixote among the Spaniards who had a dream. This man dreamed that the world was round, and everybody else thought it was flat. He said he could prove it. Finally, a woman gave her jewels that he might have his chance, and he embarked with his boats and his men and he proved that the earth was round. Just learn analgesia, and it will be fair with you if you will be fair with it. You can operate with analgesia on a person who cannot distinguish between pain and touch. You can produce conditions which are beyond belief until you have tried it. I will advise Sancho Panza to get out of the barrel, and come into the great, glad world where it is beautiful and lovely.

Dr. Barclay: Dr. Sexton says: "After cataphoresis came the high pressure syringe, with its train of dead pulps." Has he any positive data on which to base this statement? I have one patient who has had fourteen teeth desensitized by high pressure anesthesia, that was over two years ago, and the pulps are perfectly normal, as far as can be determined. I use the high pressure syringe frequently, and if used with judgment it can do no harm. It is only the cases in which its use is continued too long that it does any injury. The cocain solution is not forced into the pulp, but gets to the periphery by osmotic force through the tubuli. Dr. Prinz has clearly shown this. Consequently the pulp vessels will take care of the solution in a few days and no harm will ordinarily follow. The amount of cocain that reaches the pulp is infinitesimal. Somebody says cocain is dangerous. Everything is dangerous that is not used properly. If cocain is used its physiological antidote should be used with it, and there will be no bad results. I have used arsenic but a few times, cocain very much—it is only a matter of judgment.

Dr. D. L. Singleton: I am very much interested in this paper of Dr. Sexton's and I am glad that he has read just such a paper at this meeting. It will start a lot of thinking along this line of anesthetics that has not been done before, though I cannot agree with him in every part of it. Inasmuch as anesthesia has been coming along for a great many years, it is up to us to use it, and it is up to us to understand how to use it. We should go into every detail of anesthesia and learn how to use it, and not be afraid of it. We should get down and study anesthesia the same as we study cavity preparation or anything else. If we do not study cavity preparation we cannot do that kind of work. We should go into the study of anatomy and physical diagnosis and all that sort of thing, thus putting ourselves in position to know the symptoms and to be able to tell exactly just when we are handling cases that should have anesthetics. As far as the danger is concerned, I think people are more in danger in the hands of a man who does not understand anesthesia and is afraid of anesthetics, and I think if more dentists understood the actions of the anesthetics there would not be so much danger to the patient. I do not believe in giving everybody an anesthetic. In reading the statistics of some of the men who have used nitrous oxide in the past, we find that Dr. Thomas, of Philadelphia, has had 500,000 cases without any bad results. I believe Dr. Teter, of Cleveland, has had 13,000 without any bad effects, or possibly one. When we have statistics of this kind, it seems to me that we should make an effort along these lines to get more familiar with it. As far as exposing the dental pulp is concerned, I do not think anybody mentioned that. I think when there is a doubt as to whether the pulp is exposed, just as Dr. Sexton says, we should study the anatomy of the tooth, and even then, if he does not know that he has the exposure, while the patient is in the analgesic stage, he might put in a temporary filling until he has time to test it. We do not have to work against time in all cases, as I have followed that practice myself.

Dr. Sexton, closing: I am glad the lady to whom we have just had the pleasure of listening did not try to sell me a nitrous oxide outfit a few weeks ago, before this paper was written. With such eloquence she might have turned me into a Don Quixote again in spite of my better judgment, and then my thunder for this occasion would have been *non est.*

Her speaking of the discoverer of America as a Spanish Don Quixote reminds me of a story of the great French naturalist, Cuvier, who, as a member of the French Academy, was assisting in the compilation of a dictionary. Some of the members had defined crab as ''a little red fish that walks backwards.'' It was passed to Cuvier. ''Ah!'' he said, ''Excellent! Excellent! Only I will observe that the crab is not a fish, it is not red, and it does not walk backwards.''

Now Columbus was not a Spaniard but a Genoise, a native and a citizen of Genoa. Neither was he a Don Quixote, but a common sense Sancho Panza. He did not set out to discover a new world. He was merely looking for a shorter and a cheaper way to bring goods to Europe from the East Indies, thereby filling his pockets with daddy dollars.

Most of those discussing the paper have labored under a misapprehension. I feel like the Irishman who was arrested for murder and pleaded not guilty for three reasons: First, he didn't do it; second, he was drunk when he did it; third, it was a case of mistaken identity.

I am accused of an attempt to murder nitrous oxide. There is no such teaching in the paper. Its purpose is to teach conservatism. For several years we have been reading articles in our dental magazines heralding nitrous oxide and oxygen as the harmless and ideal method of practicing painless dentistry. I thought it about time the other side of the case were being heard from. In my opinion a good many of the dentists who are buying apparatuses today will, in a year or so, be trying to trade them for yellow dogs. I want to call your attention to one very significant fact—every one who has discussed the paper today has virtually acknowledged that there is danger in administering the two gases.

All dentists are not fitted to be anesthetists either by nature or by training. I acknowledge I am not so fitted, although I did give gas for a period of eight years. I didn't kill any one, fortunately, but I did have some cases that pretty nearly scared the life out of me. I quit it with a great sigh of relief. I never felt safe.

Now as to the cost—I believe it was Dr. Booth who said that was a minor matter and not to be considered. It may be so with Dr. Booth, but it is not so with the average dentist. The most of us have to make our living out of our practices and we are not all working for millionaires.

I had a talk with an old college friend this morning and I asked him if he were using nitrous oxide and oxygen. ''Oh, yes!'' he said. ''Do you like it?'' ''Yes, indeed.'' ''How long have you used it?'' ''About three dozen times.'' ''How many times in the last month?'' ''I haven't used it at all in the last month.'' ''What! haven't used it at all in the last month? I am afraid your enthusiasm is waning. What's the matter?''

''Well, I'll tell you the facts, Sexton. It costs too much and people won't pay me enough for it. I charge only two dollars for using it, that no more than pays my actual expense, yet people kick against that extra fee. For me it isn't practical.''

Now, two dollars isn't enough to charge for giving a general anesthetic. A physician will charge at least ten dollars. Some dentists with a rich clientele can charge an extra ten dollars every few minutes. I can't and neither can nine-tenths of the other dentists. To us the cost is prohibitive. The friend whose evidence I give above is Dr. B. A. Wright, of Latrobe, Pa.

Some one has asked about the high pressure syringe—evidently he is still clinging to that old fad. Each one of the old methods has a few enthusiasts who still support it. I never invested in a high pressure syringe. It's about the only thing I ever escaped, and I'll declare I don't know how it ever happened. What I have said of it I gathered from my reading and from talking with those who had used it.

I am accused of wanting to carry the world back into the Dark Ages, when people were dragged into the inquisition, strapped down and tortured with fiendish enjoyment. Gee! I never realized before what a devil I am. I am told also I should have been a farmer instead of a dentist. I agree to that enthusiastically. If I only had the farm I'd be one yet. I'd be a whole sight better off.

But seriously, now, I think the nitrous oxide analgesic fad has about run its course. My advice to all those who haven't yet bought an outfit is to sit on the conservative fence with me a while and keep their ears open. The castle in the air created by the Don Quixotes has already given some ominous cracks. Before long the whole structure will go to pieces. The spirit of prophecy is on me and I want to be recorded as on the Sancho Panza side. I thank you for your attention.

## SOME AIDS IN TAKING IMPRESSIONS.

### BY D. W. BARKER, M.D.S., BROOKLYN, N. Y.

WHEN taking an impression of the upper edentulous jaw it often happens that a portion of the upper lip is caught in the plaster and thus an imperfect impression is obtained; this is more apt to occur if the lip is very soft and pendulous, as in old people; or a large bubble of air is caught under the plaster with the same result.

To prevent this defect a lip elevator is very useful. It is introduced with the concave side uppermost just previous to the impression tray, and with it the lip and cheeks as far back as the buccal fraenum held up and out of the way. To facilitate this the lip muscles should be fully relaxed and to insure this the movement should be rehearsed until the patient fully understands what is required, otherwise the lip muscles will be retracted and the object of the lip elevator defeated. When the plaster has been introduced and carried up to place, the lip elevator should be removed and the patient told to say "wow," thus bringing the lip muscles forward and downward as far as they will go with the object of settling the plaster close to the labial surface of the jaw and filling any undercut and expelling air. This also is better accomplished if previously rehearsed with the empty tray in the mouth.

In taking an impression of the lower jaw, cause the patient to thrust the tongue out as far as it will go while the plaster is soft. This puts the lingual muscles on the stretch and the plate when made is not so apt to press upon them unduly.

The taste of lime is very objectionable to some patients and adds to the cause of nausea. This taste is largely overcome by flavoring the water before mixing the plaster. Take the peel of an orange or lemon, mince it, and put it in an eight ounce bottle and fill the bottle with denatured alcohol. Add about a quarter of a spoonful of this to the water used for an impression and your patient will be grateful.

Impression plaster sets so hard that in removing it it breaks into numerous small fragments, entailing a tedious job putting them together again. If the plaster is mixed with talcum (three parts plaster to one of talcum) it sets just as quickly but not so hard and breaks into larger pieces; it is seldom that more than three or four pieces are broken off in removing an impression. Also, it does not cling to the teeth so tenaciously.

A pinch of Venetian Red added to the plaster to give it a distinctive color is an aid when separating the model.

Could anybody conceive of a more foolish performance than for a man to spend the greater and the best part of his life working like a slave to get something ahead to enjoy, and to kill his enjoying capacity in the process, so that when he gets his money, and is ready to retire, he has nothing to retire to but misery and regret?

# ORAL HYGIENE AS A PUBLIC MEASURE*

BY W. B. BARRY, D. D. S., ALEXANDRIA, LA.

AT THIS present epoch of progress and scientific advancement, the medical and dental professions are devoting vigilant study to research work toward that most vital subject, the prevention rather than the cure of diseases; and we maintain that the greatest adjunct for its accomplishment is to abide by the strict and continual practice of hygiene and sanitation.

In the early ages it was claimed that diseases were the manifestations of the wrath of some offended deity, and in order to remove the scourge those afflicted would offer some sacrifice before the altars of their gods, and having implicit confidence in this practice they disregarded hygiene. But these obscure superstitions have passed into oblivion, and we are devoting the greatest scientific energy to the improvement of hygienic methods.

Since the discovery of asepsis, or the germ theory, by Sir Joseph Lister, the valiant soldiers of scientific research, such as Pasteur, Lyndal, Robert Koch and others, have, by their unswerving loyalty to their vocation, clearly demonstrated that their prophetic visions were well founded, because today hygiene and sanitation are the basis of the eradication of disease and the perpetuation of health.

The illustrious and immortal Prof. W. D. Miller, the Lister of oral sepsis, solved many dental, oral and systemic complications through his researches in oral pathology. The fundamental principles of oral pathology are by far more important than those affecting any other part of the human economy, because the oral cavity is continually an open field for the reception of micro-organisms; hence the grave necessity for oral hygiene. In order to inaugurate an oral hygiene campaign for the public throughout our state, three requisites are necessary:

First. A general awakening of the profession to its necessity.

Second. Their harmonious and undivided support and co-operation.

Third. They must have a larger range of vision than personal or financial compensation, because of the general appreciation of the fact that the means to a higher and broader professional life is unselfish consideration for that large and worthy element of humanity who are unable to pay for services rendered.

The oral cavity has been fittingly called the "Gateway of Life;" therefore by guarding and preserving it in a clean and pure condition we make it the Gateway of Health, by the establishment of personal and domestic hygiene.

Since the air which we inhale and the articles of diet we assimilate are both affected by the oral cavity, we can assert conclusively and without doubt that from fifty to seventy-five per cent. of the complaints and ills humanity is heir to could be avoided by complying with the precepts governing oral hygiene. This cause alone should appeal to us sufficiently to secure the protection and safety of future generations.

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*Read before the Louisiana State Dental Society, 1912.

We must live and think of the future and strive to build for those who are to succeed us, because the present becomes the past and the future the present in such rapid succession that the man who in any serious concern of life does not think and live in the future, is sooner or later sure to find himself hopelessly in the past.

The oral cavity is an incubator of the most perfect type for the development of bacteria, and it is obvious that these pathogenic germs are carried through the system, because 30% of the bacteria in the fæces are derived from the mouth, many having been destroyed by the gastric juices.

It is a known fact that more diseases are disseminated from our schools than from any other single cause (lack of oral hygiene the prime factor); so it is our unbounded duty to inform the school authorities of the deficiency, and they in turn will be compelled to conscientiously resort to the proper method for the conservation of the health of the children, the greatest asset of our honored State.

The school child whose mouth is unclean from decomposed food, and stagnant septic salivary matter, due to indigestion, generally exhibits pus, exudations from irritated and inflamed gum margins, gaseous emanations from decaying teeth, putrescent pulp tissue and chemical poison. With every spray from such a mouth, in coughing, sneezing, or even talking or reading, the air becomes laden with micro-organisms to be inhaled by others with most appalling results.

The fact is absolutely disregarded that a single septic mouth may vitiate and contaminate the atmosphere of a room (and most deplorably a schoolroom), and be the direct cause of the spread of disease, besides improper ventilation and superficial sanitary precautions.

Does the dental profession go beyond the limit of its province, when it suggests that it is unjust to deprive the children of our schools and the public in general of the advantages of oral hygiene education, and as a result to continue to pay annual toll to the death rate of tuberculosis and other transmissible diseases to which the public at large are now subject by forced predisposition?

If all or nearly all of the diseases occurring within the confines of the oral cavity are determined from micro-organisms directly or indirectly, and if similar conditions are responsible for systemic diseases of a serious character, then I say most emphatically that we could render no greater service to our State than to devise ways and means to have stringent laws promulgated for the propagation of oral hygiene, in connection with the present State-wide sanitary campaign.

No greater boon could come to humanity that the full recognition of the danger from insidious, prolific, and virulent infections of the mouth, and immediate plans should be formulated to instruct the public.

People become highly enthusiastic over wholesome food and sterilized articles of diet; but utterly neglect to keep the mouth, the very vestibule of life, in a hygienic condition, because they are totally ignorant of this neglect, and of its most appalling consequences.

Oral hygiene is as important as the pure food law or the screen law which prevents the flies from impregnating the food with bacteria, and other precautionary methods of sanitation. because they amount to naught if with every bolus of food myriads of bacteria are carried through the system.

By the strict and thorough practice of dental and oral hygiene we would be able to prevent the development of more diseases than by any other measure, not even excepting vaccination; therefore as a public measure it is paramount.

Oral hygiene as a public measure will come slowly at first, but as the truth dawns upon the general public, which I hope is not far distant, each Board of Health will have its dental member, every hospital, every asylum for the insane, and every reformatory, its dental and oral department, and every school its dental and oral instructor and inspector.

## REPORT OF THE COMMITTEE ON ORAL HYGIENE AND DENTAL PROPHYLAXIS.*

BY G. C. BOWLES, D.D.S., CHAIRMAN COM., DETROIT, MICH.

Gentlemen: This year I have not prepared a written report, though I do not know but I have made a mistake, for the things we are doing in this state in the Oral Hygiene Campaign ought to be known throughout the land. I say this because those in closest touch with the work throughout the country are unaware of the sound basis on which this oral hygiene movement is established and the progress it is making in Michigan. For instance, at the recent annual clinic of the First District Dental Society, Burton Lee Thorpe was present. Learning at that time of the work we were doing in this state, he said, "Gentlemen, you are farther along in this work than any other section of the country; why have you not let the world know what you are doing? Why have you hidden your light under a bushel?" Last month Dr. W. G. Ebersole came to Detroit and he, too, learned for the first time of the strides the movement has made in this state, and he, too, said, "why did you not let it be known?" Well, we have tried to let it be known. For five years reports have been written and presented to ten or fifteen men who get out to this first meeting of the session and then forwarded to the publishers and printed as a part of the proceedings of our meetings in THE DENTAL SUMMARY. There has been no beating of tom-toms, no fireworks, and so little heed has been given us, but the good work has gone steadily on. As you know, the work in Detroit is now supported by the municipality. Four dental examiners are now at work in the public schools. We have five free dental clinics. This year 50,000 children will have had their teeth examined by the dental examiners in the schools and 10,000 children will have received free dental care in the clinics.

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*Read before the Michigan State Dental Society, 1913.

Splendid work is also being done at the free clinics at Jackson, Grand Rapids, Kalamazoo and Muskegon. In addition to the examinations and the free clinics in Detroit, two illustrated lectures a week on the care and use of the teeth are given in the public schools. About forty-five schools will be reached this term. You can appreciate the value of this great educational movement on the future health and welfare of these children.

The clinics are essential to this work, but they really are of the least importance. The unfortunate sufferers, children of poor parents, must be cared for, but the educational value of the dental examinations is by far the most important factor in this campaign. Think what it means to have fifty thousand children report to their parents the conditions and needs of their mouths! In a great majority of cases these dental needs of the children will be cared for when the parents are aware of the necessity. This work should be extended to every town and village in the state, and it is a work that you men can do with a comparatively slight expenditure of time and effort, and it will repay a hundred fold.

For the work in Detroit the city appropriated $5,000 last year, and it is getting a hundred cents on the dollar for every dollar appropriated. This year we expect an appropriation of $8,000, and the work will be extended.

The committees having in charge this work have naturally learned some things, and what they have learned is at your disposal, gentlemen; we should be glad to see this work started in fifty new sections of the state during the coming year, and we stand ready to give you every help in our power. Let us realize the value of this work, and let us go home determined to do our part in extending it.

The moving picture film, "Toothache," was recently purchased by the First District Society. We believe this will be a very effective way of presenting the truths of oral hygiene to that great public which patronizes the five and ten cent picture shows. We expect to run it in Detroit for a few weeks, and then it will be at the disposal of the towns throughout the state. Let us make the fullest use of this as well as of the other means that are at our disposal to spread the gospel of oral health.

> Whatever I have tried to do in life, I have tried with all my heart to do well; whatever I have devoted myself to, I have devoted myself to completely; in great aims and in small; I have always been thoroughly in earnest.—*Dickens.*

# CURRENT EVENTS IN DENTAL LITERATURE.*

BY RUSSELL W. BUNTING, D.D.SC., ANN ARBOR, MICH.

AS WE review the dental literature for the past twelve months, we find that it has been an exceptional year in this regard. There have appeared the usual large number of the so-called technical articles, descriptive of various methods of procedure in operative, prosthetic and mechanical dentistry. But there has also been an unusually large number of articles of a theoretical nature that have so much merit that they may well be classed as scientific. Many of these contributions are noteworthy additions to our knowledge of that specific subject and are distinct advances toward a fuller understanding of many vital questions which have heretofore been but poorly understood. It is the purpose of this paper to give a brief and succinct resume of some of the more notable articles which have appeared in the various magazines, endeavoring to give them such a form that "he who runs may read."

Very early in the year there appeared an article in the *Dental Review* by Dr. G. V. Black upon a subject which has received but little attention and about which we have been very much in ignorance. The article gave the results of Dr. Black's investigations of the composition and method of formation of salivary calculus. He states that all forms of calculus are first deposited as soft agglutins and later they become hardened by a deposition of inorganic salts in them. That the amount of calculus formation is a variable quantity and depends upon the formation and retention of these agglutins upon the teeth. These soft materials which form the beginning of the calculus are the product of food metabolism and that they may be increased by over-eating or indigestion. As a result of his experiments he claims that the formation of tartar may be decreased or entirely inhibited by the following methods: By removing the soft agglutins before they become hard by means of careful daily brushing of the teeth; by a dose of epsom salts by which the agglutin bodies are directed toward the alimentary canal and eliminated there instead of the mouth; and by a limitation of the diet to a point where assimilation is complete, in which case the agglutins will not be formed. Dr. Black does not claim that his work is complete, but he has given us more definite information in regard to the control of calculus formation than we have had before.

Dr. T. B. Hartzell goes on record as having obtained results from the methods of Dr. Black. He makes this statement in a very valuable paper on the prophylaxis of pyorrhea appearing in the *Dominion Dental Journal* and the *Dental Register* for Feb., 1913. In his paper he reviews the opinions and contributions of other workers in pyorrhea. He then states his belief that pyorrhea usually begins in a local irritation to the gingival tissues by tartar, food, etc., resulting in inflammation of the gingiva and pericementum. That secondarily these areas become infected and the resultant loss of tissue is largely due to the continued infective inflammation present. In the treatment of the disease he calls especial attention to the roughened roots which have been made bare by tissue loss. He claims that in them the infections are retained and that unless they are planed to absolute smoothness the infection cannot be eliminated. The emphasis of the whole paper is placed upon the importance of planing the roots of teeth in the treatment for pyorrhea.

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*Read before the Michigan State Dental Society, 1913.

Another important contribution to the study of pyorrhea appeared in the January *Cosmos,* written by Dr. L. S. Medalia. In this he describes the disease as being a "chronic alveolar osteomyelitis." He also affirms that pyorrhea is begun by mechanical causes and that "systemic diseases play only a secondary part in starting the disease, but may be caused by it, and in turn may become responsible for keeping up local conditions." As a treatment he gives three phases, all of which he advocates. First, vaccine therapy by autogenous vaccines; second, systemic treatment, such as requiring the drinking of large quantities of water, regulated diet, drinking of sour milk, and strict personal hygiene; third, local treatment and instrumentation. From his results he claims that "vaccine treatment, together with a proper attention to diet, cures or relieves all systemic conditions, especially the rheumatic affections."

The subject which has received the most attention of scientific nature is that of dental caries. There are perhaps more men engaged in the study of the problem than any other, and during the past year they have contributed voluminously to the subject. The largest and most noteworthy publication is a volume of nearly 300 pages devoted to the study of the prevention of dental caries and oral sepsis. It contains the results of researches by Dr. Pickerill, of New Zealand, who has been engaged upon the subject for the past six years. Its importance may be judged by the tribute paid to it by Dr. Kirk, when, in a review, he makes the statement that "not since the publication of Miller's 'Micro-organisms der Mundhöle' has any work appeared upon the subject involving anything like the same character and amount of scientific research or work from which important conclusions could be drawn.

Dr. Pickerill has gone into a very detailed study of the tooth, the saliva, the foods, and all factors which may enter into the problem. He has attempted to show that there is a difference in tooth enamel in its resistance to scratching with hard substances and in its resistance to acids. He then divides all teeth into two classes, the "sclerotic" or hard, and the "malacotic" or soft, drawing the inference that the former of these is more resistant to caries. He states as the essential of the attacking force, first, acid-forming organisms of the mouth; and, second, the presence of fermentable carbohydrates.

By a careful study of the saliva in which he collected the secretions of the various glands direct from the mouth, he claims that the secretions are dependent upon the character of the foods which are ingested. That when bland or alkaline foods are eaten, the saliva is acid in character, and when acids, especially the fruit and organic acids, are taken into the mouth a strong alkaline flow is stimulated which persists for some time. Taking it for granted that an alkaline flow is desirable, he recommends that all foods should be flavored with organic acids, and that some part of the meal should consist of an acid. He also takes issue with the manufacturers of alkaline mouth washes, stating that these will stimulate acid secretions, and strongly urges that acid mouth washes be used. The book seems to cover every possible phase of the problem and offers a number of new and original suggestions. It is necessary that these be correlated by the work of others, and the actual testing out of the methods in every day practice to make them certainties.

Perhaps the greatest work that has been done on this subject in this country during the past year has been that which has been carried on under the auspices of the Dental Society of the state of New York. This work has been done in the research laboratories of the University of Columbia by Dr. Wm. Gies, director, and Dr. Max Kahn. Their results are set forth in an article in the *Dental Cosmos* for 1913, page 40, being a paper read before the New York State Society in May, 1912, and in a brochure published by Dr. Max Kahn, publishing his researches on the sulphocyanates of the saliva. The work which they have done has been along the line of the investigation of the properties of the KCNS of the saliva which has received so much attention in late years with reference to the problem of immunity to caries. Dr. Kahn in his work gives a very exhaustive review of our knowledge of this salivary constituent from the very early literature until today. They then have both discussed at some length the methods of testing for KCNS in the saliva, with especial reference to a method suggested by the author of this paper. It is evident that they have not understood the technic of the method suggested and have not been able to obtain similar results. They do, however, agree that there may be other substances in the saliva which will interfere with the ordinary ferric chloride test and give erroneous results. They then describe a gravio-metric and an iodometric method for determining sulphocyanates.

Both observers describe a very careful and painstaking work which they have put upon the investigation of the nature and the sources and occurrence of KCNS in the body. They found more KCNS in the liver than in any gland of the body, and they have inferred that it is largely formed in that organ, from which it is secreted into the bile and intestines. They also found it in the blood, the salivary glands of man, and in the human saliva. They further found that the amount of KCNS depended upon the amount of amino-acids and nitrates ingested from which they inferred that it was the product of protein metabolism. If this is true, KCNS in the saliva is then not a secretion of beneficent character, but is essentially an excretion of the end-products of protein metabolism.

In their conclusion they state as their opinion that KCNS in the quantity in which it appears in the saliva cannot appreciably retard the growth of oral bacteria, impair their nutrition, or reduce their capacity to produce acid. They also warn against the indiscriminate administration of KCNS to patients for the purpose of producing immunity, stating the possibility of toxic effects. This is but another link in the chain of evidence which is being woven against the extravagant claims for the efficiency of KCNS as an immunizing agent against dental caries.

An interesting piece of research was done by Dr. Percy Howe, in which he investigated the conditions of the saliva which were favorable to fermentation and therefore favorable to caries. His results were published in the *Dental Cosmos,* 1912, page 659. He shows a series of tabulations in which salivas which contained high percentages of phosphates had a high lactic acid formation, while those that had a high chloride content had but little lactic acid fermentation. He does not suggest any methods of controlling the phosphates or chloride secretions of the saliva, but simply gives his results as a basis for further work and investigation.

Another very valuable contribution to the inhibitive action of the saliva has been given by Dr. Jos. Head, of Philadelphia, appearing in the *Journal of the American Medical Association,* December 14, 1912, and also in the *Dental Register,* March, 1913. He reviews his previous statements in regard to acid decalcification of tooth enamel and the restraining influence of the saliva. He states that tooth enamel will be cut and etched by a 1:1000 lactic acid solution in 30 minutes, but that in the presence of saliva an acid of twice that strength will produce but little effect in one week's time. Also that if teeth which have been softened and whitened by acids be taken from the acid solution and placed in saliva that the whiteness will disappear, and the tooth will take on an appearance after several weeks that is quite like the normal. He then describes a machine that he has devised for the purpose of determining extremely small variations in resistance of teeth to pressure. The machine is a ponderous and complicated mechanism, but is designed for great accuracy of results when dealing with small bits of tooth substance. By placing teeth upon the stage of this machine he could measure their resistance, apply acids, and by the readings he could determine the rate of decalcification. From the results obtained, the decalcification produced by acids alone, as compared by that of acids combined with saliva, stood as 9:1. In this method he clearly showed that most salivas have a markedly protective action for the enamel of the tooth, and therefore that the resistance of the tooth to acids is dependent upon the nature of the saliva.

Two contributions worthy of note have been made to the study of the tooth histology. Dr. Von Beust, of Germany, in an article appearing in the *Dental Cosmos* for 1912, page 659, claims that he has established the presence of a tubular system in the enamel. By a method of staining under pressure he has succeeded in forcing fluids into the enamel from the dentine side and also from the outside toward the dentine. This he has illustrated by microphotographs, and from these he draws the conclusions that nutritive fluids may enter the enamel from the dentine and from the exterior, suggesting that this fact may be a factor in the resistance of the teeth to caries.

Mr. J. Howard Mummery, of London, presented a paper before the Royal Society of Medicine, upon the subject of the innervation of the tooth, which was published in the August number of the *Dental Register* for 1912. The question as to whether or not there are nerves in the dentine has been discussed for many years. The balance of opinion has been in later times that the nerves of the tooth are entirely confined to the pulp and do not enter the dentine at any point. From his results Mummery claims to have successfully traced nerve tissue into the dentinal tubuli, and to have followed them throughout the length of the tubuli to the dento-enamel junction. He also claims that some nerve fibres cross the dento-enamel junction and end in the enamel, but that he was not able to establish a systematic innervation of the enamel. If this work should be corroborated it would change our whole attitude toward the matter of tooth sensitivity.

Our dental literature has contained many valuable articles upon orthodontia, which are of especial interest to specialists in that line and cannot be reviewed at this time. There is one article which is of more than usual interest to the general profession. It is a contribution by Dr. M. H. Cryer, of Philadelphia, upon the "Influence Exerted by the Dental Arches in Regard to Respiration and General Health," and was published in the *Items of Interest*, January, 1913. In this article he attacks the generally accepted view that the widening of the arch increases the size of the face and the nasal passages. By sections through a large number of skulls he shows that many that have large palates have narrow nasal passages, and vice versa, that many having narrow arches have nasal passages that are amply large. He suggests that the benefits resulting from the enlargement of the arch are not derived from the widening effect upon the face and nose, but that the expansion of the arch gives more room for the tongue, which has been crowded back into the throat, where it has interfered with the nasal respiration. Enlarging the mouth allows the tongue to advance into its proper position and thus clears the posterior pharynx, allowing nasal breathing to be established.

In the discussion of this paper, Dr. G. V. I. Brown very positively asserted that the nasal passages may be widened by the enlargement of the arch, and in proof of his statement cited cases in which nasal measurements were accurately made by rhinologists upon children undergoing orthodontic treatment. In these the size of the nasal passage was markedly increased. Be that as it may, the idea as advanced by Dr. Cryer, that narrow arches crowd the tongue distally to the extent of interfering with nasal respiration, is new and interesting to most of us. It explains many cases in which the adenoids and tonsils have been removed and all obstructions removed from the nasal passages, and still the child persists in breathing through the mouth. For them we must consider the tongue as a possible factor and the orthodontic widening of the jaw may in this regard establish nasal breathing.

There appears in the April issue of The Dental Summary a paper by Dr. Marcus L. Ward, entitled "Some Changes That Have Been Made in Dental Amalgams and the Attitude of the Profession Towards Them," which presents a new phase of the amalgam question of which the profession should be generally cognizant. He takes up the various alloys that were furnished for amalgams previous to Black's work and gives especial attention to the four principal ones advocated by J. Foster Flagg. He points out that Flagg realized that four or five alloys could be made that would each possess some property to a marked degree which would make one of them more desirable in certain places than the others. He then points out how Black's work tended to place upon the market one alloy that possessed all the desirable properties of the four of Flagg's and marked the beginning of the manufacture of alloys which, when made into amalgams, gave no decrease in volume. Then he takes up the desirable and undesirable properties of the alloys made after Black's plan, pointing out that he has on several occasions called attention to the most objectionable feature of them, viz.: increase in volume with the idea that the dentists could lessen the amount of the change by more vigorous working. He then mentions that Dr. Black has recently become cognizant of this objectionable feature, suggesting that the presence of zinc is the cause of it, and urges its elimination, even fractions of a per cent. not being permissible. Dr. Ward then points out what it means to the profession to have the zinc removed as Dr. Black suggests, and what it means to leave the alloys as they are, giving them extremely vigorous working. He concludes the article with the opinion that the judgment of the profession will be in favor of the latter. (Namely, the present products of the leading manufacturers.)

In conclusion I wish to call your attention to an editorial appearing in the April issue of the *Items of Interest* of this year, which should be of interest to every practitioner of dentistry. In it the editor discusses the present status of the Taggart-Boynton suit and its application to the profession in general. He states that the verdict gave the right to Dr. Boynton to make wax patterns and moulds, but not to cast the inlay. Also that these rights are for Dr. Boynton alone and that any other practitioner is just as liable to prosecution as before. In fact Dr. Taggart has already brought two suits in Chicago, which will cover all the points of the process, and they will come to trial in the coming summer or fall. The editor then counsels caution, and warns against the belief that "everyone is now at liberty to make dental inlays," as Dr. Taggart holds a patent which relates solely to the making of a dental inlay and to the inlay itself, which as yet has not been tested.

### DISCUSSION.

G. C. Bowles, Detroit: Searching for the constituent that inhibits or prohibits dental caries, the Committee on Scientific Research, of the Dental Society of the State of New York, some five or six years ago, discovered in the saliva of immunes, something that gave a characteristic color reaction in the presence of ferric chloride. They called it potassium sulfocyanate, declared that it was absent, or relatively so in the susceptibles and that its daily administration in grain doses, through short intermittent periods, would restore its normal secretion by the salivary glands and put the susceptible into the immune class. Beautiful theory. But it didn't work. Its doting foster parent, Dr. Low, however, by forced respiration, managed to defer its interment.

In the meantime the services of Prof. William J. Gies, of Columbia University, were enlisted in the work. His third report to the New York Society appears in the January *Cosmos* of the current year. In collaboration with Max Kahn, M. D., Ph. D., a very considerable amount of highly technical chemical and physiological experimentation and investigation has been accomplished and some suggestions, some recommendations, and some definite data recorded.

For instance, it is suggested, as a result of experimentation on animals, chiefly dogs, and the chemical analysis of their various tissues and organs that HS and CN radicals arising from ordinary metabolic transformations of proteans unite, probably in the liver, to form sulphocyanate, that it is carried by the blood to all the organs of excretion and that it is present in the saliva not as a secretion but as a waste product, a more or less toxic excretion, and as such its inhibitory influence on dental caries is doubtful. Dr. Low asserted that KCNS could be administered to advantage indefinitely, even ten gram doses being harmless.

According to this report the growth of lupin seedlings in water cultures, and of timothy seedlings on wet blotting paper was strikingly impaired by potassium sulphocyanate in dilutions of 0.01 per cent., or even less. Lupin seeds soaked for eighteen hours in 0.02 per cent. KCNS solution lost all power of germination.

The growth of bacteria in gelatin and gelatin peptone media was not inhibited by 3% KCNS.

KCNS 0.05 prevented the development of lactic acid bacilli in milk for four days.

In the frog, subcutaneous doses of 5 mg. (approximately 1-12 gr.) of KCNS caused hyperesthesia, convulsions, and sometimes death. Slightly larger doses 7.5 mg. caused violent death, sometimes in a very few hours.

A dog was given 0.61 gram of KCNS (approximately 9.39 gr.) in hashed meat on each of three consecutive days. After the second dose the dog refused to eat, vomited and exhibited general tremor. The dog died in convulsions twenty-four hours after receiving the third dose.

From these and other cited experiments the conclusion is drawn that the indiscriminate internal administration of sulphocyanate by dentists for the purpose of inhibiting dental caries, without regard for its possible effect upon other organs of the body is unscientific and may be a dangerous proceeding.

Notwithstanding that the claims made for KCNS by Low and other unscientific enthusiasts appear to be discredited by the experiments of other investigators as well as by his own research, Prof. Gies considers that his subject warrants a continuation of the investigation along the lines pursued and proposed.

N. S. HOFF, Ann Arbor: Mr. President and members of the Michigan State Dental Society. The portion of this paper which I want to discuss is that containing the articles mentioned with reference to Pyorrhea Alveolaris, the paper by Dr. Hartzell, and another by Dr. Medalia, a physician of Boston.

Dr. Hartzell's paper was read before the Dominion Dental Society of Ontario last summer. The article by Dr. Medalia was read before the National Dental Association at Washington last summer. It seems to me these two articles present the subject to us in a more thorough manner than it has ever been given to us before. There are, of course, practitioners who will find in either of these articles, statements to which they will take exceptions. The paper may not appeal to us equally. The article by Dr. Medalia is written by a physician who is not a dentist, but he has been associated as a dental teacher in Tuff's Dental College, and he has made a remarkable research on this subject. I think that it is the most important contribution on this phase of the subject that has been made up to this time. From his conclusions we may differ, but the facts that he presents can be accepted without question as to their scientific value, and therefore I do not hesitate to say that it is the best article, in my judgment, that has appeared from this standpoint. The name which he endeavors to fasten on this subject is worse, in my judgment, than anything heretofore suggested, ''Chronic Alveolar Osteomyelitis,'' as I do not believe he is justified in attaching such an atrocious name to this disease. I would like to discuss the nomenclature, but it will take too long to tell you all my reasons for objecting to the various names used in describing this disease. Evidently Dr. Medalia has taken the name from the fact that he believes the disease to have its origin in the alveolar process, and is a condition of infection in that process. He in one place states that it is of local origin and is first mechanical and then infectious. By mechanical means the gum is wounded, and then the wound becomes infected from the mouth environment, or by deposits of calculus on the teeth, and many other things that are injurious to the gums, or which produce a condition which favors infection from the deposits of extraneous substances which are constantly present in the mouth. In any of these ways he accounts for the primary lesions and local infection. This is the way we account for all peridental infection usually, but when Medalia calls this disease Alveolar Myelitis, in view of the facts that its origin is almost always caused by some local lesion, I think he makes a mistake. I see no logic or reason for such a name because of the fact that we always attribute this disease to a local lesion first, and therefore sufficient credit is not given to its constant and the primary etiological factor.

The infection is also first local, and so I think it is very much better to name it gingivitis than to call it this outrageous name, which to me hasn't a significant meaning, and is certainly not likely to become generally accepted or popular.

He also says in his paper that the peridental membrane isn't an organ, but that it is a ligament. I believe it is an organ just as much as any other tissue which has a specific and definite function, notwithstanding the essayist's claim that it is not even as well organized as the bone periosteum. He states that the local beginning of the disease is in the nature of a trauma,—that is, that it is a wound which becomes infected, which infection spreads by continuity of structures, and may extend even to affect the system in general.

The treatment which he suggests is, of course, the interesting point to us. He doesn't discredit, or at least he doesn't ignore altogether the surgical treatment,—the instrumentation, if you please. Dr. Hartzell's whole article is based on treatment from the surgical standpoint and methods, and it gives us, I think, a better diagnostic basis from which we may do the technical work.

Both of these papers are valuable and very important, and they should be considered together, but each of these men treats the subject from his individual standpoint and we should therefore study their conclusions with the personal factor in mind.

The Hartzell method, as you know, involves two distinct technical methods; one to free the roots from deposits and to remove all extraneous matter from the surfaces of the roots by scaling the roots of the teeth and removing all the dead tissue which attaches to them, so as to get a surgical union of the exposed healthy tissue, and then he endeavors to get a normal surgical union by keeping the parts clean by simple antiseptic and prophylactic remedies.

Medalia's treatment involves this also, as a preliminary, but he does not pay sufficient attention to it. He gives a list of 115 patients which he has treated, most of whom were successfully treated. The large majority, about 90%, I think, were pronounced cured after from 12 months to three years, but these patients all had professional dental treatment in connection with the vaccine treatment which he gives and to which he seems to ascribe the credit. He also takes up the question of a proper diet for these patients, realizing, as most of us have, in many cases, imperfect assimilation of food as one of the chief causes of this condition. He gives some suggestion as to this line of treatment, eliminating from the diet such foods as produce a residium from over-eating, particularly of foods which clog the bowels. His principal treatment is the vaccine therapy or administration of vaccines either in the way of vaccine made directly from the patient, or the so-called stock vaccines. His method is to secure pus or blood from the infected areas of the mouth and make cultures from this, and with this medium he makes injections into the perenchymatous structures and fortifies the system from the spread of the disease by the peridental infection. He also uses the stock vaccines, or more scientifically, they are known as the corresponding vaccines, that is, vaccines that are made by drug houses or chemical concerns. He found that by making his own vaccine directly from the patients he did not get as good results as he got by using these other vaccines also, or by using these two in combination, he got very much more satisfactory results. The results as he has recorded them are certainly creditable, and some of them are quite remarkable.

If both of these methods are used, they necessarily involve a better knowledge of systemic conditions than the average dental practitioner has, and it seems to me to be a rather risky piece of work for the ordinary practitioner who hasn't studied this matter carefully. If better or improved results can be secured by vaccine therapy then this treatment should be done by some one having accurate knowledge of the treatment in all its relations. I have no doubt that the injection of the blood serum will have much to do with the correction of the tendency to the spread of this disease, in other words, it should render the body immune, but of course it can't have any effective result unless the local conditions are properly handled.

Vaccine therapy alone can't remove the deposits or other injurious conditions that remain in the mouth, and upon the teeth, and I don't see how we are going to get any benefit from this kind of treatment unless the two are worked together. In a combination of the two, it seems to me, the treatment of the severe type of this disease may be greatly benefited. Whether it is practicable in the hands of the ordinary practitioner, I have grave doubts, and with this in mind, I make this comment. I don't want you to understand that it is such a dangerous thing that a dentist could not use it, because he can, but he shall need to give it special study, to use it successfully and without injury. The vaccines are now on the market by reliable drug concerns.

However things may seem, no evil thing is success, and no good thing failure.—*Samuel Longfellow.*

# RADIOGRAPHY IN DENTISTRY.*

BY WILLIAM A. GIFFEN, D.D.S., DETROIT, MICH.

THE RATIONAL use of the Roentgen Ray, as an aid to the early diagnosis of dental lesions, is invaluable to the humanitarian dentist. I firmly believe it will prevent more suffering in the future than any other agent known to the dental profession, for the following reasons:

*First:* It is demonstrating every day that the percentage of careful, conscientious scientific root canal treatment is very low. In fact, it is astonishing to find so many devitalized teeth which have incipient or blind abscesses, due in many cases to inefficient treatment. We frequently find teeth that have never been sore or caused trouble in any way and a radiograph will show resorption of osseous tissue in the region of the apices; undoubtedly due to toxic irritation. However, when the opsonic index of those persons becomes abnormal and the physiological resistance of the tissues become lowered those cases will, undoubtedly, cause trouble.

It has been estimated that twenty-five per cent. of the people have infected areas around the ends of the roots of some of their teeth. These septic focci either complicate or produce a great variety of infectious conditions which, undoubtedly, shorten many human lives, and it is our duty to correct these conditions when we find them, as there can be no excuse for leaving any focci or infection anywhere in the mouth, providing we know where it is, and as a result of the Roentgen Ray the profession will be spurred on to do far better work and the percentage of pathologic lesions will be much decreased.

*Second:* Dentists in the future are going to take advantage of the Roentgen Ray to examine abutments for crowns and bridges, and it will enable them to use only those which can be put in condition to stand the stress of mastication, with the result that the percentage of chronic *lame* teeth under crowns and bridges will be much decreased.

*Third:* It will enable the dentist to make an early diagnosis of pathologic conditions which already exist and which he may be called upon to relieve with the result that the period of suffering by the patient will be lessened from years, months and weeks to days, hours and minutes.

## AVAILABILITY.

There is no reason why any one of you cannot learn to make radiographs if you feel inclined to go to the necessary expense to equip your offices and can give the time necessary to work out the details of the technique. The essential requirements being an efficient apparatus, industry, common-sense and a knowledge of the danger of too lengthy or too oft repeated exposures to the rays. However, this is the simplest part of the work as it requires a great deal of study and practice to become proficient in the interpretation of the radiographs after they have been made, no matter how good they may be.

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*Read before the Michigan State Dental Society, 1913.

It is a fact that fifteen operators have sacrificed their lives in this country alone, and many operators and patients have been maimed and disfigured from the same cause, so should any of you decide to take up this work in the future never fail to fully protect yourself and your patients.

While there are times when the radiograph will be disappointing and misleading, there are many conditions met with in general practice where the correct interpretation of a radiograph will enable you to make a positive diagnosis, and the dentist who does not take advantage of the Roentgen Ray in his practice is very apt to be embarrassed when treating conditions that do not respond readily by having the patient say: ''Doctor, don't you think it would be a good thing to have a radiograph made to find out what the conditions really are in this case?'' Even if they have not consulted other dentists, there is always some friend among the laity who is liable to give them this advice.

So I believe that if you wish to preserve your reputation and retain a patient with a lame tooth, do not wait if the tooth does not respond to treatment, but either make a radiograph of it or have some one do it for you, and convince that patient that you have their welfare at heart as well as your own reputation as a dentist.

## READING OF RADIOGRAPHS.

The best results can always be secured from the negative, as it will invariably show more detail than a photograph from it. While experience is a very important factor in the interpretation of radiographs, it is essential that we have an intimate knowledge of the anatomy and pathology of the parts under observation.

The negative should be mounted in a panel with a black border around it and held up to a window with north daylight coming through, or a tungsten light with a frosted globe, or best of all, to the window of an illuminated diagnostic box, and if you examine it through a magnifying lens you can observe it to the best possible advantage.

Metal fillings, posts and metal crowns, owing to their density, appear as transparent areas; gutta percha, cement, enamel and porcelain a little less transparent, then in order of their respective densities, dentine, bone, gum tissues, and last, the tissues of the lips and cheeks when they are shown on the negative at all.

I will show you radiographs of a few cases on which I have been consulted, namely: Unerupted teeth, missing teeth, lost roots, implanted teeth, perforated roots, dentigerous cysts, root absorption, foreign materials in the apical space, foreign materials in the antrum, impacted teeth, alveolar abscesses, pyorrhea and necrotic areas.

## DISCUSSION.

W. H. **Thwaites**, Grand Rapids: Dr. Giffen mentioned and showed a few slides of incipient abscess. That is, such abscesses that the patients do not know are present. To put the percentage of these abscesses at 25%, I believe would be a very conservative estimate. These abscesses, I think, mean more than is generally believed. They may cause fever, sickness of the stomach, sick headaches, and even nervous disorders, and still the patient will not know that he had anything the matter with his teeth, so that even the physician should not overlook the fact that his nervous patient is likely to have some dental disorders.

Another point was the fact that the X-ray could be used to investigate abutments in crowns and bridge work. The abutments for any crown or bridge depends largely on the amount of alveolar process around the root and not so much on the size of the root.

Another point was the shortening of the suffering by use of the X-ray. You may take a patient who is suffering—he is not suffering very much you may say—but if you take an X-ray and can stop that little bit of nervous trouble he is having, you are doing a whole lot towards helping the physical condition of that patient, and sometimes we find that the treatment we have been carrying on isn't just right, it isn't just as it should be, and a little inside information from the X-ray will put us on the right track.

Another point that is not too well emphasized is the fact of extracting deciduous teeth. I think he showed some pictures, showing where the permanent teeth have been injured in order to get the deciduous teeth out. Some of the deciduous teeth are wedged in so strongly that we are liable to crush the process while removing the roots. Such a procedure is very apt to split or otherwise injure a permanent tooth.

Then there is the point of devitalizing teeth. I think the great mistake in devitalizing teeth is the fact that we do not always devitalize teeth. We may take out a nice long nerve, but still leave part of that nerve in the tooth not devitalized, and put our gutta-percha point down to that point where the patient just feels the point going in and make up our mind that the point is right down to the apex of that tooth. The X-ray proves that very seldom can we get a gutta-percha down that far. Now if that nerve is affected by irritation or infection it is going to die, and we are going to have a lame tooth. It will sometimes take two or three years before such teeth become sufficiently abscessed, or in other words, dead enough at the apex so that there is no more lameness.

Another point that the X-ray brings out is that it does not show up the dentist nearly as much as you think it does. We have good data on what has been done. We can see exactly the treatments and a great deal of what the dentist has done, but ordinarily it shows up good conscientious work, and if there is any fault, usually it is due to the patient himself. If you find some abscess where the dentist himself knows about it, you usually find that abscess originally started with a toothache, and the patient will say he has gone a few days, or months, or years with that hole in his tooth, aching, before he went to the dentist. Now it isn't surprising that the bacteria goes through that pulp—so we are not altogether to blame when we find an abscess at the end of the root some years later.

> Life and religion are one, or neither is anything. Religion is no way of life, no show of life, no observance of any sort. It is neither the food nor the medicine of being. It is life essential.—*George MacDonald.*

# THE RESTORATION OF THE SENSES BY THE EXTRACTION OF WISDOM TEETH AND TREATMENT OF ABSCESS.*

BY C. G. DUCOTE, ALEXANDRIA, LA.

### HISTORY

Patient, age 30, suffered partial loss of the senses of taste, hearing and sight. For four years the patient consulted with specialist and received treatment, but a cure was in no way affected. Despondent and discouraged with this treatment, he went to other places where he thought that medical skill might be of better avail, but it seems that his medical advisors claimed there was nothing more to be done. Some few months later he came to me to have his mouth examined, fearing perhaps that the trouble could be brought about by defective teeth—and what did I find? The first lower molar was abscessed on the right side, and the upper second bicuspid on the left side, both of long standing. Gums were turgid and the least irration would make them bleed freely, which showed plainly a case of gingivitis, as did also the four partially erupted wisdom teeth, which, to my mind, were the causes of this trouble. He explained what he had gone through with, and the treatment he had received at the hands of the medical men. He should have been in the hands of the dental surgeon from the start. I do not wish to criticize the ''man of the healing art,'' but I believe he too often ignores our opinion in cases of this character, more especially when the cause is not ascertained, and which comes from a dental origin.

### OPERATIVE TREATMENT

A general anaesthetic was administered, preferably ether, and the wisdom teeth were taken out with the elevated forceps blades. The abscessed teeth were cured. Gingivitis was cured. Several weeks later the patient felt that his senses of taste, hearing and sight were improved, and later became normal.

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*Read before the Louisiana State Dental Society, 1912.

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# KUKAY'S SYSTEM OF BRIDGE WORK.

BY J. M. G. KUKAY, NEW YORK

This system of attachment is specially for cases of malposed or converged teeth; and can be used for any degree of angle, in anterior and posterior cases.

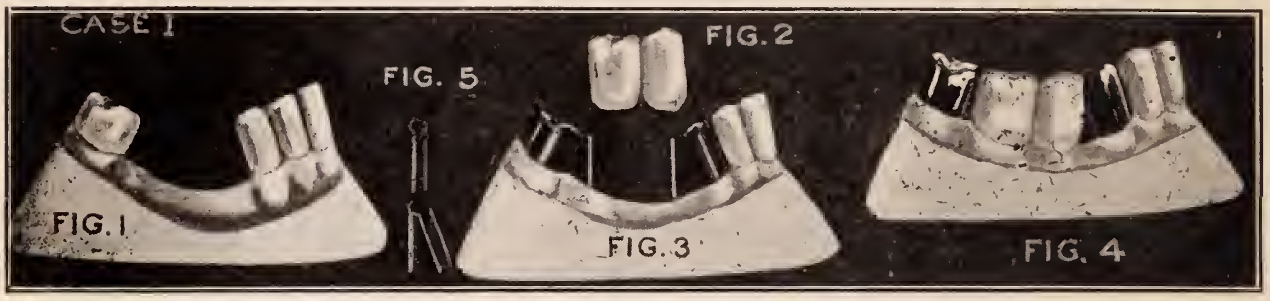
### CASE I

*Fig. 1* shows a case of great difficulty for replacing a bridge by the ordinary systems.

*Fig. 2* illustrates the body of the bridge, consisting of one bicuspid and one molar; ready for replacement (this body can be made on rubber as in metal).

*Fig. 3* illustrates the shell crown, with Kukay's diagonal support or socket, making a parallel or alignment slide for the bridge's body.

*Fig. 4* illustrates the partial removable bridge, easily replaced in position; but if one stationary bridge is desired, the slides will be cemented.



CASE II

*Fig. 1* shows a case in which the converged position of the second bicuspid is not an impediment to get a parallel socket or slide in the same direction as the central root canal.

*Fig. 2* illustrates the same case with one diagonal support soldered to the gold shell on the second bicuspid, ready to receive the bridge's body.

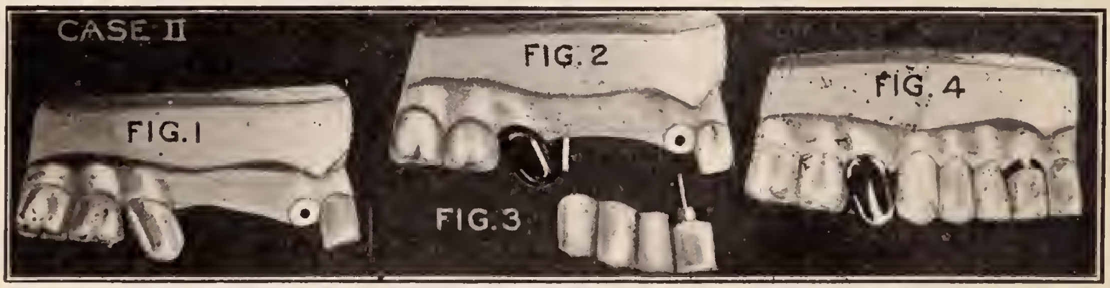


*Fig. 3* illustrates the body of the bridge, consisting of one central Richmond crown, one lateral, cuspid and bicuspid, with an inner tube parallel to the pivot, for a perfect sliding in the socket of the second bicuspid, and root canal of the central.

*Fig. 4* illustrates the stationary bridge in position, but if a removable is desired, the root canal of the central shall be provided with a cemented inner tube.

*Fig. 5* illustrates the Kukay's diagonal support or socket, and inner tube or slide, which is made in different sizes and degrees of angle, to give the alignment for sliding bridges. *A* illustrates the perpendiculer inner tube which forms part of the bridge's body. *B* illustrates the base of this invention, consisting in a diagonal solid support, which, after trimmed in the angular degree and soldered to the artificial crown or pivot, gives a perpendicular or vertical socket, to allow the sliding or replacement of bridges.

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NOTE—The author has about two hundred of these bridges replaced on his clients, and he believes that his system will be the only one for any case of removable stationary bridges.

# TREATMENT OF PULPLESS TEETH*

BY J. A. LIBBEY, D.D.S., PITTSBURG, PA.

THE ANNOUNCEMENT on your program calls for a paper. I prepared a paper for the last meeting of this society on this subject, and it was left till about the last and nearly all the members left. I am sorry now that I did not give it then, because there was a larger audience then than there is this evening . But sometimes the smaller audiences are more appreciative.

I have no paper this evening. I made up my mind that whatever I had to give you I could give better in a talk than in a paper.

There is hardly any subject in our work that has been talked on more than this subject. There is no part of it where I know of more failures than in the matter of root filling. That is the only apology for bringing this before you. I have for years had the reputation (because some years ago I did talk about it in a paper) of filling immediately every canal I find. That is not the case. There is one class of teeth that I never fill immediately. When I extract the pulp of a tooth I remove all I can of the pulp tissue, but I cannot remove to a certainty that which is of the most importance at the apex of the root. Consequently, after dilating the canal as much as I feel is proper, removing all the pulp tissue I can, I saturate that canal with pure wood creosote, (I do not use formaldehyde, which is used in some cases), then I seal it up for two or three days. In that time I can safely proceed, and fill the canal at the next sitting.

In case of a putrescent canal without a fistulous opening, which is very erroneously called a blind abscess, I open up the canal, if possible, to expel the pus. Sometimes I expel the pus by suction. In that case, if I am satisfied that I can remove the pus, I proceed until I have a slight flow of healthy blood. I then proceed immediately to fill that canal, after my thorough cleansing.

In case of a fistulous opening, after getting through with the process of cleansing the canal as thoroughly as possible by pumping a remedy through the fistulous opening, if I can, I fill it.

Not all teeth can be saved by these operations. If the abscess has been continued sufficiently long to loosen up the cementum around the root and become diseased, there is no remedy that I know of that will cure that and make a success of the operation. In that case the only necessary thing is the amputation of the apical third of the root.

My method of filling root canals has all been explained before. The first operation is to put on the rubber dam; exclude all moisture; dilate the canals as much as possible without drilling. I do not believe a person can drill a canal satisfactorily, and it is not necessary. You may drill for a distance, dilate sufficiently to have easier access to the place you want to fill; but I know of no way you can drill the entire distance. After drying it as thoroughly as I can I use sulphuric acid, 50 per cent., and follow it up with small broaches; use the Detroit twist drill; gradually dilate sufficiently, at least enough to clean as thoroughly as I can. Then introduce soda potassium on a broach, and pass it up as well as I can, and follow it with 25 per cent. pyrozone, which cleans very thoroughly; I have had very good success with it.

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*A talk before the West Virginia State Dental Society, 1912.

In cleaning a canal, it is very important not to force the apical foramen open. Dr. Buckley, in his paper before the Pennsylvania State Society last year, said that he had formerly used chloropercha points for root canal filling, but he found that with the application of the chloroform it crept away from the sides. Consequently he supposed it would have the same effect in the canal, and quit it on that account and used gutta percha instead. I demonstrated to a few of the men this afternoon with some glass tubes I had demonstrated with in Fairmont. I filled this four years ago. At that time the gutta percha was filled at the apex of those fine tubes, but there was air space in two or three places between; but the important part of the canal was filled; and it had not crept away from the sides, but gone down; which I think gives a very satisfactory demonstration that that is the thing to use. Consequently I am still an advocate of the chloropercha. I do not pump it into a canal. Nearly everyone says pump it in. Now we have here a closed tube. You take some cotton on a broach and start to pump something into that, for instance, chloropercha. As soon as you get to this distance you close up all escape for the air. You press that up a little farther and your patient will flinch as though a broach had passed through the apical foramen. It is the pressure of the air there, that pressure that causes so much soreness after the filling of canals by that method. How is it possible to get your chloropercha to that part, the important part to fill, and exclude the air from it? My method in all cases is, as I said in the first place, to place the rubber dam on, and after that is placed, if it is a superior tooth I throw the chair back so that I have gravity to assist me. In the first place, when I have a large root to fill, I will inject a slight amount of wood creosote into the canal. Often I will take a little on my broach, with a few fibers of cotton, saturate the canal, and then inject some into the canal, and take one of those fine jeweler's broaches that has been detempered (the temper has been drawn), and pass it up there, and by capillary attraction, as soon as this broach passes up to the apex, the wood creosote will follow and often before you pass the broach you will see it disappear, and very often you will see a bubble of air come down, and you know then that you have excluded the air. I then inject chloroform. The chloroform will drive out that creosote and take its place. To demonstrate that, if you place a drop of wood creosote on a slab, and a drop of chloroform, just as soon as that chloroform touches the creosote it will go like a flash. In that way I replace it with the chloroform, and have the benefit of the wood creosote. When that is done I take up a point sufficiently large that I think will just about fill the canal, take a very fine point and tap it gently; pass it up one root after the other until I have filled that as full as I can. Sometimes in a central, or even in a lateral root, I can get as much as eight and ten of those points in a canal. When I get that many I know absolutely I have filled that root perfectly.

When I have that filled, as I have demonstrated, I know positively that there is no air space above.

Now, so far as the broaches are concerned, some of the wholesale jewelers furnish the broaches, but I never like them; they are too soft, as a rule. I like them a little stiffer than they make them. I get the German broach (it is better than the English broach) of the sizes that I want. I place them on a pan with about half an inch of fine asbestos on it, with the point towards the center; then cover it up with asbestos and place it over a Bunsen burner in the laboratory and leave it for one hour; then turn off the gas and let it stand there until it is cold. You then have the temper drawn so the steel is tough, and you can tie it up in a knot. It makes a very much better broach than the ones that are supplied.

Suppose the abscess is about the point of the root, but there is no fistulous opening. This, as I said before, is erroneously called a blind abscess.

I will cite one case in my practice of a Miss H., who was attending a school of oratory in New York. She came home to visit her friends, and came into my office with her face badly swollen. She said, "I am going back Thursday." This was Monday. I opened up the canal, and immediately pus flowed out and filled up the cavity, and I swabbed it out as carefully as I could; used paper points, and the pus started again, and I kept at it till nice clear blood flowed. I put on a rubber dam as soon as I saw that clear blood, for I knew I had all the pus out of the cavity at the base of the root. I filled that canal on Wednesday; malleted a gold filling, and filled out the contour of that tooth. That was ten years ago. I saw her about two months ago, and she said that the tooth never gave her a particle of trouble. That shows what we can do by thorough work along the line of antiseptic surgery.

There was another case came to me that was very amusing. At one of the meetings of the Odontological Society, twenty years ago, I advocated immediate root filling. A few days later a gentleman came into my office and said, "I have been having a tooth treated for two months, and I am getting tired of it. The dentist says it does not seem to improve any, but we must continue the treatment. He said he had heard a man talk the other day at one of his meetings, who said he would fill at the first sitting. I asked him who it was, and he said Dr. Libbey. I got out of the chair and said, 'I wish to settle up with you; I am going to see Dr. Libbey.' " It put me on my mettle. I told him I would see what I could do. It was a large canal. I had an emergency case on hand at the time, but after I got that disposed of I put him in the chair, and when I was through I filled that tooth. I said to him, "In this case I expect there will be some soreness there tomorrow, but I think you will find that will pass away very shortly." I did not see him again for six weeks, and he said, "The next day I did not feel it, and I have not felt it since."

That is another extreme case. The tooth had been treated and treated until there was irritation setting in from the treatment. All it needed was filling and given a rest. Nature can do more than you can with remedies; all we need to do is to help nature. There is too much dependence upon remedies in the curing of all these cases. A good, thorough cleaning out and filling is better than treating for one, two or three weeks or longer, as is often done. If there was less medication and more thorough work there would be more success in the matter of root filling.

Now, in the case of a fistulous opening, suppose we have an abscess and have a fistulous opening out on the gum. After I have cleaned it out as thoroughly as I can, and put a remedy through—Dr. Buckley recommends phenol sulphuric acid. I find just as good a remedy, in that case, after I have prepared my canal as thoroughly as I can, in campho phenique. I make it myself. Take an ounce of carbolic acid and put it in a six-ounce bottle and add gum camphor to that until it will take it all up; it will make five or six ounces of campho phenique. I pump that through the fistula, if I can get it through. Then I use the chloropercha—gutta percha dissolved in chloroform. I will keep on pumping until I see I have it pumped through the fistula. If it comes through very rapidly I may, after it starts to come through, place a napkin over the fistulous opening and give some pressure to be sure; if there is a slight cavity there I want to thoroughly fill that; and if the pericementum is not diseased it will become cured. When this pericementum is loosened up from the root for some distance, the only remedy I know of is amputation. Give an anesthetic: I give a local anesthetic for that sometimes, and sometimes not. It is not such a painful operation. The best way is to operate at once; cut right in and remove some of the process there, and the safest way to do it is to take a spear point, drive through the root, then take a fissure bur and go through the roots until you have cut through on both sides. It is very easy then to remove the apex of the root. In that way you can cure those abscesses in the majority of cases.

Mr. President, I have given about all I intended to along this line. If any one wishes to ask any questions I will answer them, if I can, after the discussion.

## DISCUSSION.

President Boydston: I see by the program that I am on to open the discussion of this very interesting talk. I do not feel that I am the person to do this. I was blundering along some years ago in a blind way, until I heard Dr. Libbey's paper, or talk, on this very subject. It struck me so forcibly that I immediately got to work on it, and today I am using practically the same method that he has taught me to use. He did not give me a clinic; he gave me a personal clinic, and I can testify it has been a success. It has been very, very comfortable! and I do not believe anyone else could have had the same success with that tooth that he has had, because I know he took all the pains possible to make that tooth comfortable, and I am sure he has succeeded.

There is only one thing he said this evening that I have not heard him say before, and that is that he uses 25 per cent. solution of pyrozone for washing out his sodium potassium. I have been using distilled water for that purpose, thinking that my sodium and potassium had all saponified any tissue left in the root. If that is a mistake I would like to know it. Since I have not very much to say I will close my discussion, and let the other gentlemen on for this discussion, and those who take part in the general discussion ask the questions. I will call on Dr. Stone; he is next on the program.

Dr. J. S. Stone, Clarksburg: If Dr. Boydston had called on me first I would have said the same as he did. I listened to Dr. Libbey at Fairmont; saw the filling of the canal for Dr. Boydston; also another case he operated on; and followed his directions as nearly as I could; and I must say I have had very good success.

One little point he brought out tonight in regard to filling a canal where there was a fistulous opening. I don't believe he emphasized at Fairmont the pumping of the chloropercha through the fistula. If he did, I had forgotten it.

President Boydston: He filled the root of a tooth for a young man, and pumped the chloropercha through the fistulous opening.

Dr. Stone: Something I would like to know is what becomes of the gutta percha left in the fistula. Is that drawn off? That is the only point I don't understand.

Dr. T. O. Heatwole, Baltimore, Md.: I feel like apologizing and asking you to excuse me on the matter of discussing this paper, for the very satisfactory reason that it has been about five years since I have been in practice. However, I have had some experience with this difficult subject, and have some recollection along the line of successful root canal filling; and, moreover, Dr. Libbey treated me so nicely the other night in discussing my paper that I feel that I should not like to take issue with him if I could, and probably could not if I would.

I do feel, however, that this is one of the very most important subjects which can be presented to an association. It is not only interesting, it is not only educational to the young man, but to those of us who have had more experience, and probably have met with difficulties; and it points this moral, that the way to do things is to do things right. I believe that Dr. Libbey has solved the problem, and the success which he has attained is because of his persistency in following out what he has found to be a sound and sensible logic.

I have heard Dr. Libbey, but I had heard *of* Dr. Libbey before I ever heard him. I think my first experience in coming in contact with Dr. Libbey probably was ten years ago (maybe longer than that), when he was preaching a doctrine like what he is preaching tonight at that time; and I have heard through others of his work, and I know he is competent to teach. He took pains this evening to show me his demonstration on the point of filling root canals, and the demonstration in which he showed us that the shrinking qualities we had been attributing to gutta percha could not be given any credence. I was particularly glad to know of that, because in quite a number of instances that is absolutely the doctrine that is being preached; that gutta percha will shrink away after being placed in a canal, and especially in combination with chloroform in the form of chloropercha that there will be shrinkage. That doctrine is being preached pretty generally, and I believe the profession generally is believing absolutely in that doctrine, and with the demonstration such as he gives it will cause us to stop and to think, and when we do stop and think about these matters we are apt, at least, to hit the right track.

It is the bringing out these fine points, after all, that makes an association meeting of value to us. We begin the practice of dentistry by treating just those conditions, and the success which we attain in that line will mark the success of one's practice, so that we often feel that when patients present themselves with a condition of that kind, with a putrescent pulp, we would rather see them come into the office for anything else than for a treatment of that kind.

The old method of treatment is not at all astonishing, when we think of it in the light that the doctor has presented it. It is not at all astonishing that we, through our bungling methods, should have set up abscesses by the forcing of putrescent material through the apical spaces, and in that way set up an abscess; get hold of a quiet putrescent canal, one that has been accidentally discovered; go into it, open it up and cleanse it, and we discover the next day that we have established an abscess because of the bungling manner we have gone about it. The doctor has shown us why that is so. These fine points he has brought out certainly are the things that will be of advantage to us, and we can do well to strictly adhere to his methods, because I really believe that he is an authority on the subject.

Dr. Fred E. Hess, Fairmont: I am very much interested in this subject, but there are a few things I do not understand. In working up this creosote he says you get capillary attraction with this broach. Do you force the broach back and forth through the canal, or do you just allow it to rest in the canal clear up to the apex? And this sodium potassium 25 per cent. solution of pyrozone—I do not get that quite clear.

Dr. L. George Beerbower, Terra Alta: In the case of the gentleman whose tooth had been overtreated—to what do you attribute the soreness next day?

Dr. J. S. Stone, Clarksburg: Dr. Libbey spoke about treating a so-called blind abscess, and says when he succeeded in removing all pus and get a clear flow of blood he immediately filled the canal. He did not tell us the treatment he used in case he did not succeed in getting a clear flow of blood and get all of the pus out of the canal.

Another thing is the use of the rubber dam. I would be very glad to hear him emphasize that, because there are a whole lot of dentists who insist upon going into operations without the use of the rubber dam.

Dr. T. O. Heatwole, Baltimore, Md.: Since it is fashionable, I believe I do want to ask a question. These other questions have suggested this question to my mind. I recall, in practice some years ago, having come across two different cases, both of them being lateral incisors, with dead pulps. There were small fillings in the teeth, and on drilling through the palatal surface and in driving into the pulp chamber there was, not an escape of pus, but a discharge of blood, and with each heart beat there was a rush of arterial blood from those teeth. This was not in the same patient, but two different cases. I have never been able to solve the mystery to my own satisfaction. I believe Lr. Libbey can give me light on that. How did that happen? What was it? How did it come about?

Dr. C. H. Chapman, Webster Springs: There are many men here who have been practicing longer than I have, and, as confession is good for the soul, I wish to speak of some recent mistakes of mine relative to dead teeth. Dr. Louis Cord practices similar to Dr. Libbey. He will take an abscessed tooth with pus in it, put his sulphuric acid in there, dry it out thoroughly, and put his filling in at the same sitting, and they are all right; but I am afraid to do that. But leaving that out of the question, if we do not treat it right the first thing that we know, at the end of the root an embolus forms, and the end connects up and forms a sac, and then the budding system starts out until it connects up with the vein and forms an osteoma. The blood vessels at the apex of the tooth are the same as any other blood vessels, when we amputate up there at the apex. What happens? An embolus forms at the apex of the root; there is a disturbance there, from the great blood vessels down to the apex of the root; that forms an embolus there, and the white blood cells come and take up the matter and set up a fight, and that settles that part of it. But the sac is closed up, and when we put the little particles under a microscope this budding system had gone out and taken up with the great blood vessels, and an embolus had formed right where the small blood vessels come off from the great trunk. How many of us are able to tell that we have got all the nerve when we amputate a nerve at the apex? I know for one I never am certain. I know and you know how difficult that operation is. Taking this cracked tooth, how many times will you have to take the nerves out of the buccal root of the upper tooth or the anterior roots of the lower tooth, and know you got it out completely? I would guess that 90 per cent. couldn't amputate and fill that right. When we have practiced as long as Dr. Libbey has, and acquire the dexterity of hand that he has—but take it in general, inasmuch as we leave a part of the artery in the lower end of the root, what happens? That forms a condition where we have dry tissue hardening; you know what I mean; that stage where the tissue hardens or dries or becomes a gelatinous substance; and down there you find a little sac has formed if, indeed, an embolus has not begun. I believe the less we can have to do with the blood vessels down at the apex of the root the better for us. In dead teeth we are obliged to go down to the apex, but the other part there becomes mummified—mummification sets in in the root.

I am going to tell you a little secret, and I believe there are other men practicing it. but I believe we are afraid to tell of these methods and practices. I have had about four years' experience with it, trying it on a great many cases. I have in those cases amputated those nerves; so often when I got the pulp out of the tooth and took a bur and worked down the orifice of those canals, put on the rubber and everything else just as carefully, trying to use as good means as if I were going down to the apex; removed the nerve, put in a mummifier (I use Oxpara), and I really would like to extract some of those teeth to see what condition has really taken place down there. But after this long experience, and talking with some others, they say they never had a single one give any trouble. Now it seems to me that this is worthy of consideration. The same pathological condition exists in the whole roots that are found on the last third of that root. My practice may not be correct, but so far none of those people have abscessed for me.

Dr. Libbey (in closing): The first question asked was in reference to the gutta percha that was pumped through the fistula. Dr. Jennings, of Cleveland, I find, was the first to advocate chloropercha in this way. He went through a great many experiments, experimented on dogs, and found that the gutta percha encysted there, causing no irritation.

As to the working of a broach in the canal to establish capillary attraction, all that is necessary is to work very gently up and down. You don't want to feel that you are going through the apical foramen. And in most abscesses you cannot pump up and down and work but very gently, and you will see the creosote escape, leave; see it down in the open canal in the first place, and that is the evidence that the air has been excluded.

The reason I use the preparation of peroxide, 25 per cent. pyrozone, is for the same principle exactly that I use it in bleaching a tooth, and if, with the sodium potassium and that, I can succeed in bleaching a tooth very nicely, I know I can clean a canal with them very thoroughly.

To what did I attribute the soreness of the tooth I had filled immediately? In the first place, there was soreness there when I filled it, and the chloroform added to the irritation a little. That is all the explanation I have for that.

Dr. Heatwole's question about the lateral incisor: on opening into it it bled. I have often found, in the pressure method of extracting pulps, that if we do not go thoroughly at the time of that operation—if we extract the pulp by the use of the pressure method—all that we get is a little bit of nerve-fiber, like a fine thread. Nothing there. We seal that up, and in the course of a week we have a hemorrhage from it. We have not removed the blood vessels. I do not believe that was your case. I often find that, and for that reason I do not believe in the pressure method for the extraction of pulps. I do it the good old way, with a little bit of arsenic, and after I have left that for two or three days, a small amount—sometimes a little longer than that—I remove it. I do not at that time extract the pulp, but even then the pulp is about devitalized; but I do not attempt then to extract it, but go at it with the treatment like Dr. Chapman suggests; I commence mummifying it; place a treatment of wood creosote in there, seal it up, and leave it for two or three days or a week before extracting the pulp, and I am pretty sure to get the pulp out to the apex, and if I do leave some small amount of pulp at the apex, I later get that out or remove it.

I do not know exactly how to answer Dr. Chapman's discussion this evening. He has been a student along the line of histology. Don't you think that the profession of dentistry, as long as we have been working and studying, trying to elevate our profession—that it is about time we quit this thing of using preparations we don't know the formula of? We have plenty of remedies we can use for that purpose. I don't think the profession should use any secret remedies. We have plenty of remedies for every part of our practice without going into those things.

I am glad he spoke of that, because I wanted to tell you what I know along that line. I have seen treatment with oxpara that worked very nicely. Good results at the time may last; but a good many have been filling canals with a mixture of oxpara and insert it in there and then insert a gutta percha point in there. Now, that sort of crystalizes or hardens, and it makes an ugly and difficult thing to remove if that is necessary. It is formaldehyde in the oxpara that does the work, and if we want to raise our professional standard let us get away from every patent remedy that comes around and we do not know what we are using.

So far as his method in this case is concerned, I believe the mummifying work all right, in a great many cases. I believe if the work is thoroughly sealed there will be no bad results; but if the time ever comes when there is an opening into the canal you are going to have trouble.

Two other points I want to speak of, one in reference to the buccal roots of superior molars, and the anterior canals of inferior molars. I do not pretend, in all cases, to be able to fill these canals thoroughly; I do not believe any other man does. Dr. Fletcher, of Cincinnati, says, in this connection, that he uses the very smallest bur. That was Dr. Herbst's remedy, too. In those very small canals, where it is impossible to open up, they place a little bit of arsenic over the opening and cover with oxide of zinc, and depend on that as a mummifier. But I do not like arsenic to be left there in any case, even in a small amount; but in those cases I do the best I can with the very fine points, and work remedies as well as I can; try to work a little creosote in there, and then a little chloropercha; but to open up, drill out those canals, many of them, it is absolutely impossible; I don't believe any man can do it: but with those very fine canals with the treatment I spoke of, unless it is a very exceptional case, they never give any trouble.

Referring to Dr. Heatwole's question, I believe that case was a recent devitalization of that pulp, or it was a pulp where a disruption had taken place at the apex of the root. There was a large opening, and so much that there was some hypertrophy of the tooth there in that canal. Didn't you find that it had large apical openings? I cannot account for it unless there had been great pressure on the tissue at the time. I have seen those cases, but I would not think it would be so if the pulp died naturally.

Dr. Frank L. Wright, Wheeling: Suppose an abscess on one of the laterals, and that it lays back on the palatal surface of the bone. How do you treat that?

**Dr. Libbey:** If you can pump through it, pump the chloropercha through, just as I have described. If you don't cure it, the next best thing is forceps.

**Dr. C. H. Chapman**, Webster Springs: I have a young lady patient coming from a tubercular family, who came to me with a dead nerve. I removed the dead nerve, let the pus out, and from time to time I have pumped carbolic acid through the fistula and it looks like it was going to get well; and in a few days she will come back again and the pus will flow out. It is a serumal pus.

**Dr. Libbey:** You have a cyst there. The only cure for that is amputation. If you amputate that root you will be more apt to cure the case. You will not otherwise, because when the pericementum has become diseased we have no opportunity to cure it.

There is another abscess I am not able to cure. If anyone can cure it I would like to know it; pericemental abscess. I have worked with them and tried every method I could: heat, etc., and couldn't relieve it in any way, but had to extract it to get relief.

**Dr. W. W. Reynolds**, Weston, W. Va.: Has it ever been shown that the root filling of the chloropercha does shrink from the walls of the root canal after it has been filled?

**Dr. Libbey:** I made a filling in these glass tubes and it did not shrink from the walls, but shrunk lengthwise. This was deposited four years ago. You can see little air spaces, two on one, three on the other, but in both of them the apex was filled. That is what we are after. Those little spaces down there do not matter. There was no sign at all of any space along the walls of those cavities, and glass would be more likely to show it than the tooth structure.

**Dr. J. S. Stone**, Clarksburg: Now, where you didn't get the pus all out?

**Dr. Libbey:** In that case I would use that creosote formaline, after having used the sulphuric acid, 50 per cent. solution. I have not had much experience with Dr. Buckley's new remedy, but I believe it is good; just as good as the other, the treatment of phenol sulphuric; that is Dr. Cook's formula. One or two others call for quite a process to go through applying it and in preparing it; but I believe you will get just as good results with equal parts of phenol and sulphuric acid. In a case of that kind I would treat the tooth two or three times to be sure.

# PRESIDENT'S ADDRESS.*

### BY C. R. CONVERSE, SPRINGFIELD, OHIO

MR. Chairman, members of the State Dental Society, and friends: It affords me great pleasure as your presiding officer to extend to all our members a hearty greeting and to our guests a most cordial welcome.

I feel assured that each and every member of this society will endeavor to make this, our forty-seventh annual meeting, both interesting and profitable, with the result that this interest and profit will benefit us throughout the coming year.

It is a matter of congratulation that our annual meeting is so great and powerful a magnet as to draw to its sessions, at this busy season of the year, so many members. I feel that every dentist in the state who has the interest of his patients at heart should attend each session of our society.

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*Address before the Ohio State Dental Society, Dec., 1912.

It is a great mistake on the part of every non-attendant to deprive himself of the information and good fellowship one gains from these gatherings.

It should be the pride of every dentist in this great commonwealth of ours to become an active member of some local society and also a member of the state society. It has been clearly demonstrated that one of the greatest aids in the up-building of our profession is society work.

Our state society brings us together and establishes a friendly consideration for one another and our local societies augment that feeling still more.

It seems to me expedient at this time to say that we, as a state society, should consider the matter of becoming a component of the National Dental Society. If I have been correctly advised, the majority of the component societies of the state society have considered this matter, have acted officially upon the question and have recommended the affiliation. Since ours is the first society, with a large membership, to meet since the Washington meeting, our attitude toward this question will be of interest to the other societies which meet later.

The Washington (D. C.) and the Arizona societies have voted to become affiliated with their entire membership. I heartily recommend that the Ohio state Society become a component of our National Dental Society. The affiliation would be one more step in advance, and as this is an age of progression along all lines—political, religious, social, educational, as well as professional—it would be well to take this step.

The professional man, and the dentist in particular, must be interested in all things that tend to the upbuilding of his profession, a profession that is one of the most charitable and humane of all intellectual and technical callings.

We should set our standard high and build up to them, both as a society and as individuals. As individuals, what are some of the standards which should appeal to the thoughtful dentist? One of the first, to my mind, is a thorough consecration to the work and a sincere willingness to serve.

By this is meant a large intellectual service which will be of benefit to suffering mankind. Then kind words, gentle touch, dignity, cleanliness and cheerfulness are far more worthy traits and ideals than the brusque business methods employed by some of the profession.

Should a dentist hope, by the breadth of his learnings and the wealth of his attainments, to attract people to him, regardless of his morals or sympathy, disappointment and failure are sure to be his lot.

Personal qualities of an acceptable character are absolutely essential to professional success. In establishing lasting friendships that contribute to material success, it is necessary that sobriety, purity of life and all the common virtues have a large place.

Our "Code of Ethics" should be that greatest of all ethical laws, the one which includes all the teachings of the Code, "Do unto others as you would have others do unto you." If we will only keep this law before us and try to live up to the best that is in us, we shall not need any other code of ethics.

In conclusion, I wish to extend to all the committees my sincere gratitude for their most efficient work in arranging for this successful meeting. To our honorable secretary, I extend my sincere thanks for his loyal support during my term of office.

I have one request to make, and that is that all of you try to be present at the exact time and hour of our sessions. In this way only can sufficient time be devoted to the reading of the papers and for complete discussion of same.

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## PRESIDENT'S ADDRESS.*

BY HARRY F. KOONTZ, D.D.S.

THE CLOSING of the thirty-second year of the Odontological Society of Western Pennsylvania imparts a feeling of gratitude and pleasure to us all. Grateful that some of our oldest members (and there are many on our roll) were energetic enough to organize and labor to an end of which we may all feel proud, we are now a well organized and effectual body, having in our power to bring our state society into our midst once in two or three years and giving it an ideal place to conduct its sessions with surroundings unequaled anywhere.

It ought to be and is a pleasure to all the younger members, as well as the older ones, to know that our enrollment is among the largest in the state, that our membership is representative, and that we have among the best medical men in our city and community some staunch advocates of the need of our profession in dealing with human ills. We should, therefore, one and all, cultivate a closer relationship with our medical brethren so that we may be able to harmonize and interlock our several efforts so that humanity may get the full benefit of our combined knowledge. Several conferences during the past year at the request of physicians leads me to believe that if a more thorough understanding and enlightenment were entered into on our part it would result in ultimate benefit to everyone.

I recognize a lack of harmony in our organization collectively, and recommend an individual effort to correct it. We could and ought to be a much stronger body if this were eliminated, for the spirit of broadness and professional benefit to us all should dominate. We should have more enthusiasm and interest in the program by others than the program committee. Good ideas for clinics and papers ought to be suggested by each member of the society, for it would be of benefit to all.

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*Read before the Odontological Society of Western Penn., 1913.

I would recommend for your careful perusal the paper in a late *Cosmos* by Dr. C. M. McCauley, of Austin, Texas, on "The Great Need of Improvement in the Manufacture of Dental Alloys," read before the National Dental Association last fall, and advise that we, as a body, recognize its resultant benefits and lend our organized efforts to demand a uniform product that will meet scientific requirements.

A careful consideration of the matter of the official organ of this society should be taken up and properly disposed of, as we know such an one exists in name only, it would mean a lever toward better papers and clinics and result in a decided improvement over our present method.

I found it advantageous to have an Exhibit Committee acting separately instead of having that duty fall to the Program Committee, as heretofore, for the detail of that particular branch requires much labor and results in an arduous task for the program committee. Since it worked so well would recommend that it hve further consideration.

It seems imperative that some changes in our constitution and by-laws be made, as a careful analyzing of our receipts and disbursements would indicate that our dues are improperly proportioned, and that one-third of the present dues is inadequate to maintain, with proper dignity, our organization. The conducting of our several meetings annually together with its attractions could be greatly improved if the dues were four instead of three dollars, the division being equal instead of one-third, as now exists.

It seems also expedient that a more careful consideration of our applicants for membership should be inaugurated and that each member should have notice in writing thirty days before the ballot is taken, of data, such as year of graduation and college, former residence and place of previous practice, if any. It is thus obvious that time for reflection by all the society will make an applicant stand on his merits.

I wish to take this opportunity of thanking and congratulating the Oral Hygiene and Film Committee in their work. Those in close touch with them realize the extent of their labors. They have and are covering a large field and have an organization that promises some pleasing results that will benefit and enthuse the child as well as the adult to a proper care of their dental organs.

I desire to thank the other officers and committees as well as all the members for their hearty co-operation during the past year and regret that I am finishing instead of starting my year.

### DISCUSSION.

DR. PETERS: In regard to one item in the President's address, I want to call attention to his remarks on increasing the dues of our society. In my President's address, last year, I embodied the suggestion that our dues be raised from three dollars to four, providing an amount to be divided equally between our society and the State Society. I think our society needs a two-dollar dues more than the State Society does. It seems to me that the State organization could get along with a one-dollar dues more easily than the local society, inasmuch as at each meeting it derives a revenue from exhibitors and other sources which, in nearly every instance, defrays the expense of the meeting. Another point is that many of the members never get any benefit from the dues paid to the State Society, for it has a very small representation at the meetings from each individual society. Last year, when this was discussed and a motion was made to raise the dues to four dollars, it was voted down. I hope the members will consider this carefully and act accordingly, as we need more revenue in order to produce good meetings.

SECRETARY: In reply to this member, I wish to state that the State Society requires each member to pay two dollars, and we could not divide the dues in any way in order to retain two dollars per member except to raise the dues to four dollars.

CHAIRMAN: Let us have a report from the Film Committee.

DR. MCFADDEN: Our Film Committee has arranged a plan which we think would place the responsibility on each locality for handling the film. We divided Pittsburgh into ten sections and we appointed a chairman for each section, requesting these chairmen to get their local people together and make their local arrangements for handling the film. The downtown sections got together and gave a lecture, with the assistance of the Film Committee, at Carnegie Lecture Hall, under the auspices of the Academy of Science and Art. They had a fairly good attendance and some of you who were there know the results of the meeting. Before that meeting, we got in touch with the Pittsburgh *Gazette-Times* and had a good write-up, using some pictures from the film. Since the lecture in Carnegie Music Hall, we have not shown the film in Pittsburgh, as the chairmen of the sections in Pittsburgh proper do not seem to get together, but outside of Pittsburgh the film has been exhibited about once a week since February 14th, when it was shown here. Every place it has been shown they have reported very gratifying success. At Wilmerding Dr. McMasters had the film for one day and he told me that they showed it to at least two thousand people. In Morgantown they had splendid results with it. It has been at Union City, Evans City, Mercer, Keystone, W. Va., Charleroi, and in all, about seven places all over the country, all reporting splendid results. We took the cuts that were in the *Gazette-Times* and had them mounted on blocks, so that they could be used in local papers, and can rent them to any community that wants them at one dollar for each issue. We have had a number of slides made from a series of skulls, showing the development of teeth from youth to old age. We have about twenty-five of them, which can be sent out with the film and which are very interesting. We showed the film in the High School Auditorium in Wilkinsburg, and had shown with it some local moving pictures. We had a centennial celebration out there last fall, and had a street parade, a baby parade, etc. Our local moving picture man, Mr. Roland, put on those pictures for us, and we had a houseful, and it was a very enthusiastic audience, in fact, more than we could seat, probably 1,400 or 1,500 people. They were very much interested, and the people are getting more interested every day. I would like to see the chairmen of the various sections in Pittsburgh which we appointed get together and show the film in Pittsburgh in the different localities. There is no use trying to create interest in mouth hygiene unless the localities work together and get the philanthropic people and teachers, the children and parents interested in the subject. Our idea in dividing Pittsburgh into sections was to have the people in these different sections get the teachers and philanthropists interested in the movement and show the film in their own sections.

DR. J. F. BIDDLE: I believe it would be poor policy at the present time to raise the dues of this organization unless it be absolutely necessary and the treasury practically down to rock bottom. Will it be, after the meeting is paid for and the dues turned over to the State Society?

TREASURER: I should imagine that we would have, after the expenses of the meeting are paid and the dues are divided with the State Society, perhaps $400. We now have $981.09. We would certainly not have more than $400 left, and this would only cover the expenses of another year, unless we get a large addition to our membership.

DR. J. F. BIDDLE: Even so, I believe it would be better to keep the dues down for the present, lest we decrease our membership, instead of increasing it. If we need money are there not enough members of this Society who would be willing to help out? Our President says: "We should therefore, one and all, cultivate a closer relationship with our medical brethren so that we may be able to harmonize and interlock our several efforts so that humanity may get the full benefit of our combined knowledge." I agree with the President that we should have closer co-operation with the medical profession, but I am not in favor of all the advances being made by members of the dental profession as he implies. Some of the medical men seem to have the impression that the dental profession is not a very learned one. In a measure, is this not our own fault? There are many cases of minor oral surgery, which every dentist ought to be able to take care of, but which he sends to an oral surgeon or to some one else. We have the degree of D. D. S., and what use do many of us make of it? Anything out of the line of simple fillings, extractions, crowns, etc., we refer to some one else. The majority, if not all of these minor operations, should be taken care of by the dentist.

DR. KING: I know of a case where one of the internes in a hospital had both the degree of M. D. and D. D. S. A case of double fracture came and the physicians treated it for seven days and wired it, but couldn't hold the jaw. Finally they discovered that this interne had the degree of dentistry and they asked him to make a splint. I happened to be the only dentist he knew and I helped him make a splint, and we held the jaw nicely. There was only one doctor in the hospital who showed any interest whatever. In thirty days we had made two splints and held two jaws. Cases of this kind belong to the dentists, and not to the physicians. Physicians as a whole are awakening a little more to the importance of the mouth and realizing that we dentists can do something. If a case is along mechanical lines, it should be referred to the dentist. As Dr. Biddle says, the physicians certainly need us more than we need them.

DR. ROBERT ZUGSMITH: I rise to suggest a point which was called to my attention, and that is in regard to the term "doctor." It seems to be the general rule to use that term to apply only to physicians. A physician is no more a doctor than a dentist is. In speaking of the two professions we should use the terms to distinguish them and use these terms properly. Physicians are physicians, and dentists are dentists. The term "doctor" covers them both. The term "doctor" is used as one of respect, and we are entitled to respect as much as is the physician, and where the case deserves distinction we should make it. Use "physician" only when physician is meant, and "dentist" only when you mean dentist.

DR. A. C. BARCLAY: The president makes mention of Dr. McCauley's paper, read at the National Dental Association meeting. I have word from Dr. McCauley that the paper as published in the *Dental Cosmos* was censured. If you want to know what was really in the paper it might be a good idea to write to Dr. McCauley and ask him to send you a copy. In this society there are plenty of men who could write a paper on alloys, and I would suggest to the incoming president and the program committee that they get busy and have something like that for next year's meeting we could have a little research committee along that line, as the dental college has an instrument for testing alloys. Dr. McCauley's experiments covered 34 alloys, I believe, and as there are many which have never been tested, it might be a good thing for us to help stir the manufacturers up a little. Along the lines of dues, it seems to me the membership committee is on the right track—instead of raising the dues, raise the membership. That was one of the arguments at the meeting of the National Dental Association. If we leave the dues at three dollars and get more men, the actual amount of money in the treasury at the end of the year will be greater than if the dues are raised to four dollars. Along the line of physicians, my experience has been that they are awakening a great deal to the matter of looking at the mouth before operations, etc. It is rather amusing, the things they attribute to the mouth, the suspicions they have in regard to its conditions, and the consultations they have about them. One of our ablest physicians treated a tumor in a patient's mouth for six months and finally decided to operate for its removal. Incidentally, however, he told the patient that he might see a dentist before they operated. Fifteen minutes' work by a dentist caused the tumor to disappear, in a month or so. We have given much to the medical profession; we have taught them anesthesia and have taught the surgeon the value of iodine, and it seems to me that it is time for them to bring us something. I happen to know of a number of cases where they are *not* bringing us something, but are bringing it to some one else. They look into the mouth of a patient to see if he has pyorrhea, and then tell him he will have to go to a specialist, because an ordinary dentist can't treat it properly. I would also suggest that some one tell the medical profession to ask Dr. Biddle to read a paper at the next meeting of their society. Dr. Rinehart mentioned sending people to hospitals for operations. When it comes down to the removal of small areas of dead bone in a patient's mouth, which is an important operation in the eyes of surgeons in the hospitals, this can be done at the office of the dentist just as well and just as thoroughly, and the patient who cannot afford it does not have to pay from fifty to three hundred dollars.

**Dr. S. M. Stauffer:** Dr. King says ‘‘that we should have closer relations with the medical profession.’’ This is something that is becoming more essential than ever, but it will require a little work on the part of some one. There are many cases in which the M. D. is overlooking the conditions of the mouth, which is a deplorable fact. We ourselves, although dentists, overlook a great many of these cases, and don't know what to do with them when they are brought to our attention. If we ourselves do not know, what is to be done? I would recommend, as was suggested before the State Society last year, when Dr. Land read a paper on ‘‘Oral Sepsis,’’ that we as a society take up the subject and investigate it until we fathom the depths of the present mysterious conditions. It is something we should make a study of. Let each individual consider himself appointed a commmittee of one to try to do something along this line. We will have to learn something and we must not be afraid to investigate. As it were, try it on the dog first. We human dogs are too much afraid of experimenting. How are we to gain knowledge if we do not experiment? I could cite you many cases, if time would permit, where a little knowledge and advice brought about wonderful results, but I can only suggest, as before,—start in and learn something yourself. Dr. Biddle spoke of the deplorable conditions of the mouth during the period of pregnancy. This may be only too true, but this is the result of other abnormal physical conditions confronting us in these cases. What do the majority of these cases do? They over-indulge by trying to eat food enough to supply two. What is the result? Another point along this line is, why do these teeth decay? What do they know about selecting food that contains enough soda and lime? Do the physicians know this? I have had experience in many cases, where, I am sorry to say, the physicians have not had knowledge of what foods contain, but I am glad to report that we are making progress and add an occasional convert to our methods.

Dr. McFadden: I might say that I think we would do well, when we find something that we do not understand, to send it to some one who knows more about it than we do. This thing of trying to do something that we don't know much about, just because we happen to have our degree of D. D. S., and are called "doctor," is doing the wrong thing. If a case of broken jaw came to me I would not think of touching it, unless it was in the back woods, where other assistance could not be had. I would send it to a man who knows how to make splints for broken jaws. If a child with irregular teeth came to me I would not take the case, but would send it to an orthodontist; a case of pyorrhea to a pyorrhea specialist, etc. This is an age of specialties, and unless we confine ourselves to a certain line, we cannot become experts in any line. If we try to do the work of a physician and a dentist, too, we will never become exceptionally good at either.

Dr. J. H. Crawford: I think there is a slight misconception among the members regarding the attitude of physicians to the dentists. In my experience in the institution that I serve there is no antagonism between the medical and the dental men, but they are in the closest harmony. Cases that should belong to the dentist are referred to the dentist, and I think the attitude of the medical profession is very fair toward us. I think they realize that they do need us, probably more than we realize when we need them. We are accustomed to looking into the mouth and seeing a cavity and filling it, rather than seeing a diseased mouth, and I think we are at fault as much as they are in not recognizing diseases emanating from the mouth. Osler first, and later Mayo, and then William Hunter and several others have aroused the medical profession to the need of cleansing the mouth and putting it into an aseptic condition. It cannot always be put into a sterile condition, and for that reason I think that if we, as dentists, are to perform operations on the bones of the mouth, we need a great deal more clinical material in our colleges to teach the graduates something of these operations. I feel, down deep in my heart, without disparagement to the dental profession, that quite a large percentage of dental graduates are not equipped to perform operations on the bones of the mouth, and I think that if they were equipped mentally and educated for that purpose, the problem would be solved. The method of sterilization in most dental offices is not competent to make it feasible for dentists, as a rule, to perform these operations in their offices. I have tried operating in various offices, and I have never been quite so well satisfied with results as when I take the patient to a hospital and operate under aseptic precautions and conditions, having the intestinal tract cleaned out and the mouth put into good condition. We should perform operations in the same manner and by the same rules that are in vogue in general surgery. A large percentage of the members of the dental profession are not equipped to perform these mouth operations in their offices.

Dr. J. F. Biddle: With regard to sending cases to the hospitals, there are a great many operations which cannot be satisfactorily performed in any other place, but at the same time there are a great many cases sent to hospitals unnecessarily. Many patients cannot afford to be taken to a hospital and detained two or three weeks for simple operations that could be performed just as well in our offices. Some claim that we have not aseptic conditions in our offices. If not, it is our own fault, for we all can and *should* have them, and I believe the majority do have them.

Dr. A. W. McCullough: I am very glad that the President's paper has had the effect of bringing up all this discussion. I likewise feel that the medical man is getting a little the worst of it from this discussion. My experience with the medical profession has been that they are willing to be taught and to work with us. They are not willing to admit that we may know more than they do, but they are willing to work with us. That is the ground upon which we must hope to gain a closer affiliation with them. We cannot tell them that such and such must be, but if we will co-operate and help to educate each other we will get good results. The majority of hospitals have dentists on their staffs. I have not found it at all difficult to get anything you might want in the hospital that will be of help to you. They are more than willing to provide theses things if you show them the necessity for such. They are not willing to place things there for one case a year, or even one a month, but if you can show the need, and their frequent use, they are willing to supply them. In regard to fractures, you must admit that we are not all able to cope with these conditions, although by making a study of it this is possible. This thing of one man trying to do everything I think is past. We are coming more to the point of specializing than ever before. There are some things some of us can do better than others, and we should work to further increase our knowledge and ability on these things, and other things that we do not care about so much or probably not as proficient, let somebody else do. Some men like plate work—I do not, and I would not care if I *never* made a plate. But the men who like it and do it well are the ones who should do it. As to the use of splints in fracture, there is more than one appliance that might be termed splint, but which you probably find in medical books and nowhere else. The interdental splint is most uncleanly. With the appliances on the market, and our own ingenuity, we should be able to devise an appliance for the most complicated. There are hardly any two alike, but experience has proven that if you study your case and use your own inventive genius and mechanical skill, your results are assured.

DR. KOONTZ, closing: I did not think, when I started to write this paper, that it would kick up a row like this. However, I feel benefited by it. It has given us all an idea of the other fellow's conception of things, although some of the ideas in my paper which have been under discussion were meant a little differently from the way they were taken. What I wanted most particularly to do, was to get the medical and dental professions together. We all know that medical men, after they are enlightened and get in touch with the dental men, are as enthusiastic as the dentists themselves, but often the physician goes at things in a dark way that a dentist could simplify without any trouble. I have in mind a patient I have under treatment, who has been through one or two operations and who has been advised by two or three physicians and surgeons to have another operation. One said he had ulcer of the stomach, another tuberculosis, etc. He had a temperature of 101 2-5°. An X-ray picture showed nine abscesses. Crowns were on all of the roots with no natural crowns in the upper jaw. The roots were all open and the crowns cemented with gutta percha, and spaces around the necks, with food lying in them. X-ray pictures were taken, the roots were opened up and the crowns taken off, and it is now a little over a month since the case came in, and I find the swelling and the condition around the roots disappearing, the contour of the eminences of the cuspids was obliterated around the front. His temperature has gone down and he is feeling better and, while, of course, only time will tell, his physician feels sure that this was the cause of the running temperature and that we may get results. I have in mind another case where a dentist was called in on Saturday and applied antiphlogistine. The following Tuesday noon I was called in and found that pus had burrowed into the floor of the mouth and it was necessary to open it up and drain it, and it took me a week or ten days to get her into condition so that she could get up and be around the house and get her meals. All from an abscessed third molar. If the physician knew that something around the face or mouth or jaws was wrong and knew that he did not have an intelligent conception of the conditions and would get in touch with a dentist, a whole lot of suffering and bad effects could be eliminated. As to the dentist in the hospital, it seems to me that if this also were taken in the proper way and the medical profession would work in conjunction with us and be favorable to us, it would be just as easy to get dental dispensaries and clinics in the hospitals as a Nose and Throat Department. It is certainly just as important. But it is all a matter of education. Dr. Barclay refers to Dr. McCauley's paper; my idea in referring to that paper in particular was this fact which impressed me—that 95% or 98% amalgam fillings are placed to one of any other kind. Those who have read that paper will remember that, of all the tests that were made, I do not believe that any of them were perfect. One or two were nearly what they should be. Amalgams in general shrank and expanded for a year after they were placed. If we can get good amalgam, as we are dependent on it as a large factor in our repair work, we should get together as a body and demand it, if it can be produced. We ought to demand it, and if we do we will get it in the dental depots.

## DENTAL FEES*

BY T. M. DUPUY, D. D. S., ALEXANDRIA. LA.

IN THESE days of progress and enlightenment, with the wheels of Time rolling on and on over countless pages of history, marking the changes and development of the human race, we are all, more or less, attracted very forcibly to the many changes that have taken place in the science and practice of dentistry.

Taking a retrospective glance, one might recall with pleasure and point with distinct pride, to the names of many of our greatest men who have labored endlessly and untiringly to elevate the profession of dentistry to a plane, where it would take its place among the honored professions of to-day. How well these men succeeded we alone can tell, and we alone must dig and delve into the realms of time and space and solve for ourselves the problems that confront the dentist to-day.

To my mind, gentlemen, the most important subject of dentistry that appeals to me and to you as well, is the question of prices—fees, money. Yes—that is the question I am going to ask you all: What are you going to do about it?

With every branch of industry going up—the high price of living constantly increasing at the will of the moneyed kings—are we going to stand still and see these things go beyond our reach simply because we haven't got manhood enough in us to say "I'll go you one better"?

Contrast the past with the present and you will realize that dentistry is the only branch of science that is not keeping abreast with the times in so far as the proportionate gain in the cost of its production.

Men are beginning to realize the necessity of co-operation in all walks of life, and in these days of studying the cost of conducting a business which has been going on over the entire country, it is only right and proper that we dentists should fall in line and study our own profession with a view to proper remuneration, because if we do not, some of us will surely go to the wall.

There has been an awakening all over the country among the dentists in regard to the right minimum prices of different pieces of work manufactured by the dentist, and an earnest appeal for authentic data to work from has been vigorously solicited; and some of our journals have given us a very fair idea of what is necessary to bring this subject to a focus.

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*Read before the Louisiana State Dental Society, 1912.

I have been and still am a strong advocate of better remuneration for our services; but I regret to say that we are not meeting with much help from the various members of our profession.

Times have changed greatly in the last ten years and we are now rapidly facing a period of progression or retrogression. Some of our men are way ahead of the times, while a great many of us are still infected with the hook-worm good and strong. According to Dun's report, living has gone up 50 per cent in the last ten years; if that is so you must make twice as much money today as you did ten years ago in order to live properly, or be contented with a mere existence. If you must make twice as much money to-day as you did ten years ago to break even, you will be required to charge twice as much for your work to-day as you did ten years ago. But are you doing it? Is your neighbor doing it? Is "everybody doing it"? Well, it's a mighty sweet song but it's a plain, everyday lie, we are not all doing it at all. Am I right?

Let us see how the point acts. Suppose you go into a merchant's store and buy a $30.00 suit which you know only lasts one season. Could your merchant make a living if that suit lasted ten years instead of one year? Well, I should say not. But suppose you make a bridge for this same merchant for $30.00 and it should and sometimes will last him ten years, haven't you given him just exactly ten times as much for his money as he gave you for yours? Surely. Well, where is the rub? The point is he has beat you ten to one and you can't see the point yet.

If you buy two pairs of shoes at $5.00 per pair and they last you only one year, why should your merchant expect the bridge you have made for ten dollars to last him ten years?

If the bread and meat you require to live have gone up and all the other necessaries of life proportionately increased, why then should we not share equally in this enormous cost of high living?

While in New Orleans last fall, I called upon a few of my friends and casually inquired into their method of doing business, what they were charging for certain fixed pieces of work, and I was utterly amazed to find that some of our youngest practitioners had completely surpassed all expectations and were way above the fees of some of our oldest and best men. One man showed me his books, and bear this in mind, this man is a beginner, barely in his thirties, and practicing only eight years, and yet this young man told me that on two occasions he had received $2,500.00 for his services for putting the mouths of two of his patients in perfect condition, and also had received in a dozen or more cases $1,000.00 for the same attention, yet not quite so complicated as the first two cases. Think of this, gentlemen! Here is a man, young, ambitious, full of energy, untiring in his determination to make a success of his life by making people pay what his services are really worth. Is it not time for some of us to wake up? Well, I should say so.

Contrast the fees of our professional friends, the doctor and the lawyer and let us see what is the result.

The doctor spends three years at college, costing an average of about $500.00 a session. The lawyer gets through on sometimes one year at approximately $500.00, while the dentist spends the same amount of time and labor as the doctor does, but the cost is twice as much as the doctor and nearly three times as much as the lawyer. Simply because, as you know, to study dentistry we are compelled to furnish all the materials with which to work and besides the most expensive instruments incident to practice. The lawyer's fees cannot be scheduled; it is simply a question of being a better talker than the other fellow and beat him out of his property and money, besides. The doctor with a few dashes of Latin and Greek, can sit down in his easy chair and "write them out" at a dollar per minute, while the poor dentist is digging along "to beat the band," to polish up a set of badly discolored-nicotined monstrosities which possibly took him two hours and yet have the patient almost drop dead when you say $1.00 please.

Let us assume that it costs six hundred per year to study dentistry; we must also bear in mind that we are losing our services for the same time, which we value at a small average of $50.00 per month or $600.00 a year, making a total of $1,200.00 or $3,600.00 spent in acquiring a dental education during a period of three years.

It has been computed that the average man works 283 days out of a year, approximately an average of 2,000 hours working time during a year. If your office hours are from 9 to 12 and 1 to 6 P. M. you are working 8 hours per day. Now suppose, for the sake of argument, we charge a small fee of $1.00 per hour or $8.00 per day; that would mean just $2,000.00 revenue per year. Well, let us see if you are really making a living? It costs a dentist $3,600.00 for his dental education. Now if this item were put on interest at 8 per cent it would realize $288.00. Now we presume that the average dental equipment costs $1,000.00 This at 8 per cent interest makes $80.00 and we figure that our salary should be at least $1,000.00 a year, which totalizes at $2,288.00 for the first year of practice; and yet your yearly income at $1.00 per hour is only $2,000.00. It simply means that you will be in the hole just $288.00 at the end of your first year's practice, if you charge only one dollar per hour for every hour that you work the first year.

Now can any sane man tell me that he can keep this up—live and be happy? Impossible, absolutely impossible. I have in my mind a schedule that is appearing in one of our daily papers, and I can hardly conceive how it is possible for a man to live in these days in the face of such enormous expenses and charges:

> DISSOLUTION NOTICE.
>
> Dr. R. L. Roberts wishes to announce that he and Dr. Barry have mutually dissolved partnership, and that he expects to go into other business after January 1st, but from now until then he wishes to give all of his friends and patients an opportunity to have work done at reduced rates as thus quoted: Gold filling, $1.50 to $3.50; gold inlays, $3.50 to $5.00; silver filling, $1.00;

> gold crowns and bridge work, $5.00 to $7.00 per tooth; rubber plates, $7.50 to $12.50; celluloid and cast metal plates, $12.50 to $15.00. Extractions, 50c. All work guaranteed. Office over Schnack's Jewelry Store.

It is high time that the country dentist should fall in line with the progressive spirit of the day and all get together and adopt a minimum scale of prices without a maximum limit, or prepare a scale for a gradual raising of prices which would in a measure tend to equalize the high cost of living.

There is no profession that requires as costly an outfit or the expensive supplies that must be constantly replenished out of the dentist's earnings. The average dental office today is better equipped than the best dental office of 25 years ago. And yet this new office is run on the same old-time fees, simply because Dr. So-and-So, who lived 50 years ago, charged so-and-so for his work.

Had all dentists commenced to train the public into a higher and proper fee system when they should, I am sure dentistry today would be out of the cheap rut of low fees and would be running neck and neck with the other professions in which men are making fortunes. And yet who could have foretold that the great torrential wave of high living would so soon overtake us and make us paupers, lest we make up with new life, new ambition, new energy, new business and new and larger fees?

Because dental fees have been kept low by the very men who should have raised them, is no reason for a failure for us to commence now and correct the condition that has made dentistry poor, niggardly and cheap. The time is ripe for improvement and it remains to be seen whether or not the Louisiana dentists will take the initiative in this great reform and lend their every effort toward correcting an evil that is surely sapping the very heart's blood of our cherished profession.

Before concluding, I wish to take this means of thanking the Louisiana State Dental Society for the distinguished privilege I have enjoyed at being placed upon its program, and I want to thank you one and all for your indulgence in listening to the few words I had to say, however, I cannot let this opportunity go by without expressing my most sanguine appreciation of the honor that you have conferred upon us in having selected Alexandria for your home-coming feast. You have come many miles to find yourselves in the very heart of Louisiana's God Blessed Paradise. I know of no city or town in the State of Louisiana where people are more energetic, and more hospitable than you will find in the City of Alexandria. We feel a distinct pride at your coming here and sincerely hope that after you leave us that your very souls will imbibe the warmth and fragrance of purest friendship that will leave nothing but the sweetest recollection of friends made and won. I thank you.

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The divorce courts are crowded with men and women who conceived the idea that they had to go away from home to be appreciated.

# A COMMUNICATION FROM THE NATIONAL MOUTH HYGIENE ASSOCIATION.*

Cleveland, Ohio, Nov. 20, 1912.

To the Members of the Ohio State Dental Society:
Gentlemen:

The National Mouth Hygiene Association has planned a nation-wide campaign for the purpose of:

*First*, bringing about legislation which will permit local Boards of Health and Boards of Education to co-operate in the establishment of a complete system of medical and dental inspection, and in establishing and maintaining medical and dental clinics to care for the indigent poor.

*Second,* to secure legislation which will make it possible to protect the public from that class of dental practice which is a menace to not only the individual but to the health of the community.

*Third,* to secure legislation which will not only improve the conditions surrounding the teaching profession of this country but enable Boards of Education to pay salaries commensurate with the service rendered.

At the present time there is no state law in Ohio which will permit either Boards of Education or Boards of Health to establish and maintain medical and dental clinics for treating the indigent poor. The need of laws which will permit of the establishment of suitable clinics will be conceded by all and needs no comment.

That there should be laws passed and placed upon the statute books which will protect the public from that class of dentistry which Dr. Hunter of England so thoroughly condemns in his article, also goes without saying.

Statistics compiled by the Michigan State Board of Health show that 27.6 per cent. of the public school teachers of the country succumb to the ravages of tuberculosis, while 9.4 per cent. of the people in other walks of life succumb to this disease. What is true of tuberculosis is true to a great extent of all other diseases; and if the investigations of the Michigan State Board of Health are correct, it certainly makes the teaching profession a very hazardous one. It is conceded on all sides that the teaching profession is decidedly underpaid for the service rendered, many of the teachers having to rely upon what they can earn during vacation to help support them through the year. Therefore, in our campaign for health improvement in the public schools of the land, the Association feels that it should also make an effort to secure sufficient compensation for the teaching profession to permit them to spend their vacations in a manner which is conducive to good health.

The Association is planning to begin its initial work in Ohio, with a view of having laws passed which will make conditions in this state ideal from the three standpoints mentioned above.

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*Read before the Ohio State Dental Society, 1912.

The Association most respectfully solicits the endorsement and co-operation of the Ohio State Dental Society in the campaign outlined above.

Respectfully submitted,
NATIONAL MOUTH HYGIENE ASSOCIATION.
W. G. Ebersole, Secretary-treasurer.

## NATIONAL DENTAL SOCIETY

### DR OTTO. U. KING CHOSEN SECRETARY OF THE NATIONAL

THE DENTAL SUMMARY is very much pleased to extend congratulations to the National Dental Association on its wisdom in selecting Dr. Otto U. King, of Huntington, Indiana, as its secretary. Dr. King is now serving his sixth consecutive term as secretary of the Indiana State, where his peculiar fitness for the work has been amply demonstrated. There isn't a stronger component in the National than the Indiana society, and much of its rapid growth and solidarity are due to Dr. King's efforts—and he's a royal good fellow at that.

The election of Dr. Homer C. Brown, of Columbus, as president, was foreseen by Dr. Brown's friends, as he has been an indefatigable worker for the National for many years, having done much to insure prompt and emphatic action on the part of several state societies looking toward amalgamation with the national body.

The seventeenth annual session of the National Dental Association, held in Kansas City July 8th to 11th, was one of the most important meetings in the history of the association. More than three thousand were registered and every one seemed to be well satisfied with the meeting.

The reorganized National became effective at this meeting, but the first meeting under the reorganization will be in 1914, which will be held at Rochester, N. Y., July 14th to 17th.

Practically every state society that has met since the Washington meeting has become a constituent of the National and it would seem that the first year under the reorganization of the National will have at least 12,500 members, which possibly may be increased to 14,000 or 15,000.

It is expected that a National Dental Journal will be established at a very early date, but in the meantime plans are under way for issuing a quarterly bulletin which will keep the members in touch with the affairs of the Association. The 1913 proceedings will be published by the *Dental Cosmos* as heretofore.

The first house of delegates was organized on the second day of the meeting with 35 societies represented.

The work of Dr. Weston A. Price, Cleveland, Ohio, was highly commended and provision was made for a National Dental Scientific Research and Foundation Commission consisting of 27 members. This commission selected Dr. Weston A. Price, chairman; Dr. Thomas P. Hinman, vice chairman; Dr. Clarence J. Grieves, secretary-treasurer, and they, together with Dr. John V. Conzett and Dr. Eugene R. Warner, constitute the executive board, to have general control over the administration of the affairs when the commission is not in session.

The following officers were elected:

President, Dr. Homer C. Brown, Columbus, Ohio; first vice president, Dr. Charles Channing Allen, Kansas City; second vice president, Dr. M. L. Rhein, New York City; third vice president, Dr. H. H. Johnson, Macon, Ga.; general secretary, Dr. Otto U. King, Huntington, Ind.; treasurer, Dr. H. B. McFadden, Philadelphia, Pa.

The following were elected as members on the board of trustees to serve one year:

Dr. H. J. Burkhart, Batavia, N. Y.; Dr. Thomas P. Hinman, Atlanta, Ga.; Dr. J. P. Buckley, Chicago, Ill.; Dr. Thomas B. Hartzell, Minneapolis, Minn.; Dr. Eugene R. Warner, Denver, Colo.; Dr. Clarence J. Grieves, Baltimore, Md.; Dr. Arthur R. Melendy, Knoxville, Tenn.; Dr. Frank L. Platt, San Francisco, Cala.; Dr. C. L. White, Oklahoma City, Okla. Dr. Homer C. Brown, president; Dr. Otto U. King, general secretary, ex-officio members.

Place of meeting, Rochester, N. Y., July 14th to 17th, 1914.

### NATIONAL DENTAL SCIENTIFIC RESEARCH AND FOUNDATION COMMISSION.

Five-Year—Weston A. Price, Cleveland, Ohio; Thomas P. Hinman, Atlanta, Georgia; Clarence J. Grieves, Baltimore, Maryland; John V. Conzett, Dubuque, Iowa; Eugene R. Warner, Denver, Colorado.

Four-Year—Edward C. Kirk, Philadelphia, Pennsylvania; Wm. Carr, New York City, New York; Truman W. Brophy, Chicago, Illinois; G. V. Black, Chicago, Illinois; M. H. Fletcher, Cincinnati, Ohio.

Three-Year—Thomas B. Hartzell, Minneapolis, Minnesota; Arthur R. Melendy, Knoxville, Tennessee; Edward S. Gaylord, New Haven, Connecticut; Henry C. Ferris, New York City, New York; Charles Channing Allen, Kansas City, Missouri.

Two-Year—Frank O. Hetrick, Ottawa, Kansas; Marcus L. Ward, Ann Arbor, Michigan; Frank L. Platt, San Francisco, California; C. S. Van Horn, Bloomsburg, Pennsylvania; R. H. Volland, Iowa City, Iowa.

One-Year—C. M. McCauley, Abilene, Texas; George E. Hunt, Indianapolis, Indiana; Eugene Smith, Boston, Massachusetts; J. E. Chace, Ocala, Florida; Samuel H. McAfee, New Orleans, Louisiana.

Ex-officio Members—Homer S. Brown, President, Columbus, Ohio; Otto U. King, general secretary, Huntington, Ind.

### The Feminine 5-ft. Shelf

Were I to fill that five-foot shelf
With books designed to please myself,
I'd give four feet to books of checks
Like those Lord Skibo's treasure decks,
With here and there slipped in the pile
John D.'s account with Standard Ile;
And for the other foot of books,
Like Moore, I'd choose just Woman's Looks!

## SCIENTIFIC FOUNDATION AND RESEARCH COMMISSION

The success attained by the Scientific Foundation Fund Committee in the securing of money for a Foundation Fund for research and of the free use of many thoroughly equipped laboratories, was sufficiently great that the House of Delegates, which is the official body of the National Dental Association under its reorganization, by unanimous vote, changed its Constitution to provide for a commission of twenty-five men to immediately place into operation the complete plan of the Scientific Foundation Fund Committee for supporting and establishing exhaustive research, and for the securing of endowments for a National Dental Research Institute.

The Constitution was amended as follows:

The committee on Scientific Foundation Fund shall be changed to a commission to be known as the National Dental Scientific Foundation and Research Commission. It shall consist of twenty-five members, who shall be elected by the Board of Trustees, not more than two of whom shall be from any one state. They shall serve for five years, except that of the first commission five shall serve for one year, five for two years, five for three years, five for four years and five for five years, as shall be designated when they are elected. They shall meet annually at the time of the meeting of the National Dental Association and at such other times as shall be designated by their Executive Board.

The duties of the commission shall be to raise funds for carrying on exhaustive dental and oral research, to disseminate scientific knowledge, to support, establish and encourage research and such other duties as shall pertain to the furthering of this cause. They shall select from their number an executive board of five members, which shall, when the commission is not in session and has not given specific directions, have general control of the administration of the affairs of the commission and general supervision of all arrangements for administration, research and other matters undertaken or promoted by the commission. They shall organize and incorporate a corporation to be known as the National Dental Research Foundation and Institute, or such other name as the commission shall select, which corporation shall receive, invest and disburse all the moneys provided by the commission and by themselves. They shall organize this corporation in accordance with the laws and requirements controlling such institutions, except that not less than one-third of the trustees of said corporation shall be provided by the National Dental Association. This corporation shall seek bequests, endowments, fellowships and such other contributions as shall perfect the purpose of the National Dental Association. They shall make a written annual report to the commission and to the National Dental Association.

The commission was elected, met and organized, selecting their officers and executive board. The personnel of the commission elected follows:

Weston A. Price, Cleveland, Ohio, chairman; Thomas P. Hinman, Atlanta, Georgia, vice chairman; Clarence J. Grieves, Baltimore, Md., secretary and treasurer; John V. Conzett, Dubuque, Iowa, member of executive board; E. R. Warner, Denver, Colo., member executive board; Edward C. Kirk, Philadelphia, Pa. (Editor "*Dental Cosmos*"); Wm. Carr, New York City (ex-president 1907); Truman W. Brophy, Chicago, Ill.; G. V. Black, Chicago, Ill. (ex-president 1900); M. H. Fletcher, Cincinnati, O.; Thomas Hartzell, Minneapolis, Minn.; Arthur R. Melendy, Knoxville, Tenn. (ex-president 1911); Edward S. Gaylord, New Haven, Conn. (ex-president, 1910); Henry C. Ferris, New York City; Charles C. Allen, Kansas City, Mo. (editor "*Western Dental Journal*"); Frank O. Hetrick, Ottawa, Kansas (ex-president 1912); Marcus L. Ward, Ann Arbor, Michigan; Frank L. Platt, San Francisco, Cal. (editor "*Pacific Dental Journal*"); C. S. Van Horn, Bloomsburg, Pa.; R. H. Volland, Iowa City, Iowa; C. M. McCauley, Abilene, Texas; George E. Hunt, Indianapolis, Ind. (editor "*Oral Hygiene*"); Eugene Smith, Boston, Mass.; J. E. Chase, Ocala, Florida; Samuel H. McAfee, New Orleans, Louisiana.

The plan pursued by the Foundation Committee was adopted, namely, to raise funds from three sources: First, from the members of the dental profession by their giving, as nearly universally as possible, a voluntary contribution each year for five years to start the work. Second, a popular fund from the laity to be obtained largely by the activity of the members of the dental profession, and, third, an endowment fund to make the work permanent.

The committee had already secured contributions exceeding $15,000.00 in signed individual pledges covering a period of five years, or $3,000.00 per year, from the few societies to which the chairman was able to go and present the matter, as follows: Cincinnati, $2,767.00, with the first year's payment entirely paid in; Columbus, $1,200.00; Toledo, $500.00; Cleveland, $4,010.00; Alumni Association of the Dental Department of the University of Iowa, $500.00; St. Louis Dental Society, $500.00; Alumni Association of the Louisville Dental College, $500.00; Indiana State Dental Society, $800.00; Washington, D. C., $705.00; Pennsylvania State and Susquehanna Societies, $782.00; contributions at the Kansas City National Meeting, $2,600.00; miscellaneous, $500.00; total, $15,364.00. It is expected that each state will provide in voluntary contributions an amount equal to five times the number of dentists in the state. On this basis Ohio, with 2,400 dentists, has already provided over $9,000.00 of her $12,000.00 proportion. The commission has decided that the need for immediately assisting dental and oral research is so great that they will begin work at once by providing technicians or laboratory assistants to make possible a much larger output from some of the men who are already voluntarily devoting a part of their time in dental researches and doing excellent work. This definite assistance to research work will be done to the amount of resources already available. However, present contracts will have to be limited to a total of $4,000.00 for one year. This will be used to hire expert assistants for helping those who are doing excellent work and with available good laboratory equipment in the following subjects: Systemic infections from dental origin, pyorrhea alveolaris and kindred affections, etiology of caries, salivary analysis, etiology of erosion, dental amalgams, metallurgy for substitutes for platinum, etc., and the relation of foods to defective tooth structure. Ten of these expert laboratory assistants or technicians are greatly needed at once and the $4,000.00 available now will only permit of four or five of these. It is greatly desired that the members of the profession will arrange to have the subscription plan thoroughly organized at once in their respective conventions, so that the others can be placed yet this fall. It will require about an average of $5.00 per active member of dental societies to make up for those who cannot be reached. The subscriptions are running from $1.00 to $100.00 per year for five years. Literature and subscription blanks will be furnished by writing to the chairman of the commission.

This is only preliminary work and the commission will engage the part or entire time of some expert research workers as soon as the funds can be obtained. The chairman has already secured for the National Dental Association privileges for research in the following laboratories and institutions; the Cushing Laboratory for Pathological Research, Cleveland; Case School of Applied Science Research Laboratory, Cleveland; Iowa State University Research Laboratories, Michigan State University Research Laboratories, Hygienic Department of the U. S. Department of Health of Washington, Bellevue Hospital Research Laboratory, New York; Cincinnati Hospital Research Laboratory, Parke-Davis Research Laboratory, Detroit; University of Chicago and several other competent institutions

There are also a number of men with the research spirit found to be available whose heart is so engrossed in that work that they are now devoting much time and energy to that work without compensation, but who have to struggle for the necessities of life. The commission will place some of these men in these available equipped laboratories as soon as funds can be secured. We do not present it as a professional duty, simply, but as a great personal opportunity; we do not ask of you self-sacrifice, but self-realization, for it is our privilege by supporting this work to help to emancipate society from its most universal malady, and also the one that probably causes more total suffering, directly and indirectly, than any other.

WESTON A. PRICE, Chairman,
10406 Euclid Ave., Cleveland, Ohio.

# EDITORIAL

## PRICES OF DENTAL GOODS AGAIN

In the May number of The Dental Summary was printed an article on the cost of dental goods, in which the writer took the position that, compared with household furniture of similar grade and with other articles in common use, dental goods were not only not exorbitant in price, but were sold at very low figures.

Not only is this entirely true, but it also is true that many dental supplies in common use are sold at prices that allow no greater profit than investments in real estate and other first-class securities.

Every man who has any intimate acquaintance with business knows that the first cost of goods, that is, the price paid to the manufacturer, is not by any means all that enters into the fixing of prices at which goods must be sold in order to yield a living return. In fact, any man who bases his prices upon that factor alone is headed straight for the bankruptcy court, toward which he is traveling faster than the Twentieth Century Limited.

To the first cost, the price paid for the goods, must be added the cost of doing business, loss in weight or bulk, deterioration of stock, cost of keeping accounts, collection, loss of bad debts and a dozen other items that may not suggest themselves to the buyer, particularly since, in the dental business, he is a professional man, dealing only or solely with the one factor of personal service.

The total of such items of cost and expense makes up a percentage that would be amazing to the uninitiated; and this total has been increasing rapidly during the past ten years or more, while the prices at which goods are sold have remained practically unchanged.

If any of our readers care to investigate the matter, let him take up the item of hotel bills for travelers· Ten years ago there were hundreds of hotels in the smaller cities and towns charging a daily rate of $1.25 to $2.00 per day. Most, if not all of these hotels, have advanced their rates to from $2.00 to $4.00 per day. The other day a railroad announced an increase in passenger tariff of 50%, and all other items have increased proportionately.

As a matter of fact, almost, if not quite every single factor, including wages and salaries, is upon a much higher basis than formerly, and this necessarily so. Men and women must live, and, if they are to do their best work, must enjoy an income enabling them to live in accordance with their own ideas of living. This means, of course, that a salary that would have been ample ten or a dozen years ago is by no means satisfactory now; and, of course, must be increased in proportion to the advanced and still advancing cost of living.

While the "high cost of living" of which so much has been said and written lately may, in some instances, be traced to unfair and unethical conduct upon the part of some few concerns enjoying a monopoly in one or more articles in common demand, by far the greater part of the upward tendency should be charged to changing conditions throughout our country, changes that are sure to continue until America and Europe have arrived at a more nearly common level. As this country grows older, the population becomes more dense, the demand for everything increases, the supply proportionately diminishing, which means first of all increasing prices, and last of all, a readjustment in the scale of living on the part of the great masses of the people, who, particularly in this country, have been and, doubtless, will continue to be, very slow to give up many things that they have come to consider the necessaries of life, but which have been recognized in Europe for many years as among the luxuries that only the comparatively wealthy can afford.

All this means to us that the present high cost of living and of doing business is not merely a passing phase, due to some temporary cause that may be expected to pass away, but is fundamental, due to causes that are sure to prevail, perhaps even increase, as time goes on. It follows. therefore, if the present methods of doing business are to continue, that not only dentists, but all others may expect a stiffening up in prices, a general increase along the line, in order to meet conditions that seem certain to be permanent, at least for a long term of years. The general cost of living is said to have increased 17% during the past year.

Of course, it is but fair that the consumer, in the case of the dentist, his patients, must eventually pay the increase, but whether the increased cost is passed on to the patient or absorbed by the dentist, it seems to us that the increase is sure to come, and we may as well prepare for it.

G. E. HARTER.

## HEROES

One dared to die. In a swift moment's space
Fell in War's forefront, laughter on his face.
Bronze tells his fame in many a market-place.

Another dared to live. The long years through
Felt his heart's-blood ooze, like crimson dew,
For Duty's sake, and smiled. And no one knew.

—*Hilton R. Greer.*

# THE DENTAL SUMMARY

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# REGULAR CONTRIBUTIONS

## THE DIAGNOSIS OF DISEASES OF THE DENTAL PULP*

BY HERMANN PRINZ, A.M., M.D., D.D.S., ST. LOUIS, MO.

A CORRECT diagnosis of a normal, a diseased, or a dead pulp *in situ* is always a matter of great difficulty, and this difficulty is materially increased if the tooth under consideration does not present any visible signs of derangement or if the subjective pain as referred to by the patient is of an obscure nature. The antecedent history of the case and the character of the pain furnish most valuable diagnostic aids, and especially pain, as subjectively expressed by the patient, is of great diagnostic importance. Pain is an expression of disease; it is the conscious manifestation of a morbid change within the nerve centers brought about by some form of irritation and it is always referred to the periphery. It is the monitor of approaching ills, the criterion of the intensity of the traumatic insult, and to its autocratic demands the most obstinate patient relentlessly has to submit. The varieties of pain may be clinically expressed as being of a boring, throbbing, fulgurating, lancinating or diffused character, or by many other similes, such as gnawing, jumping, etc. Various physical tests of the tooth, viz., color, translucency, conductivity of temperature, percussion sound, etc., are additional adjuncts which are usually employed in combination with the previous named factors. If a carious defect is present in the tooth under consideration, the application of certain chemicals to the carious spot also may furnish fairly valuable diagnostic hints. The diagnostic value of these various tests is, to some extent at least, helpful in arriving at some possible conclusions, usually a diagnosis by exclusion, but these tests furnish no positive proof of the respective condition of the pulp. The discoloration of a tooth may be brought about directly by the various filling materials or, indirectly, by the formation of metallic salts or oxides, i. e., in amalgams, by recurrent caries under the filling, or by leakage of the filling. The transillumination of a tooth by means of the electric mouth lamp may furnish a fairly reliable shadow picture of the living pulp; the picture is diffused when a dead pulp is present. Owing to the thickness of the crown, the anterior teeth are more easily transilluminated. In the bicuspids, and especially in the molars, the thick body of the tooth crowns prevents ready transillumination, and, as a consequence, the diagnostic value of the light rays is much diminished. The transparency of a tooth may not be altered perceptibly by the death of its pulp. Transillumination of the oral structures should always be conducted in a darkened room, so as to intensify the shadow picture. The heat test is also serviceable, but by no means absolute. Usually this test is made by placing a pellet of heated gutta percha, or some other material which is a poor conductor, on the surface of the suspected tooth. A diseased or a dead pulp does not respond in the same manner as a tooth with a normal pulp. A purulent pulp usually responds quickly to a temperature above the normal, while a dead pulp does not respond at all. By continuity the heat rays often produce a response from the pericementum. The thickness of the tooth structure and the presence of various filling materials may, according to their nature, increase or decrease the conductivity of heat. Walkhoff makes the statement that the normal pulp will not react between 60 degrees F. and 120 degrees F. Pain produced by water heated below 90 degrees F. indicates inflammation, while pain produced by water heated above this temperature indicates the formation of pus. A most interesting exhibition of the thermal reactions of the pulp is given by Jack (Louis Jack, American text book of Operative Dentistry, second edition). He has shown that some individuals tolerate temperature changes (as applied to their teeth) between 32 degrees F. to 75 degrees F. below and between 118 degrees F. to 155 degrees F. above the normal temperature of the body. Some persons will experience pain between 75-77 degrees F., while others will not complain even above 145 degrees F. From this very wide range of responses to temperature changes it is but clear that this test as a diagnostic aid in pulp diseases has its limitations. Tapping the tooth with a steel instrument is frequently employed. Percussion is best performed by striking the tooth with the butt end of a steel instrument, employing a sharp blow. The peculiar dullness of the resultant sound from a tooth with a purulent or a dead pulp as compared with that from a normal tooth can be distinctly discerned by the trained ear. The dullness of the sound is probably caused by inflammatory changes of the peridental membrane resulting from the diseased or dead pulp or from external causes. The infiltration and the thickness of the fibers change the relationship of the tooth to the alveolar bone, and, consequently, the sound waves produced by the tapping have not that full, clear tone which we perceive from a similar percussion of a tooth with a normal pulp and healthy pericementum. The application of a few drops of formaldehyde solution in a deep seated cavity, as suggested by Preiswerck, will bring forth a series of painful reactions which may be useful as diagnostic hints regarding the condition of the pulp. In very obscure cases the roentgenogram may furnish a fair shadow picture of possible pulp stones, an unerupted tooth or some other hidden cause. It requires a well trained eye to correctly interpret pictures of this nature, especially the beginner is apt to see things which are often imaginary. Within recent years the electric current has been advocated as a means of diagnosing diseases of the pulp. The results obtained by this process are very gratifying and its use for such purposes deserves to be highly recommended.

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*Read before the Ohio State Dental Society, Dec., 1912.

Without entering into a discussion of the historical data which we have fully set forth elsewhere (Prinz: Dental Materia Medica and Therapeutics, St. Louis, Mo., 1909,), let us state that the kind of electric current best suited for our purposes is the combined faradic current, although the reduced direct current may be employed with equal success. The alternating current cannot be used for such work.

### THE FARADIC BATTERY AND ITS ACCESSORIES.

The faradic battery delivers an easily controlled current of minute quantity. Two forms of induction coils, in connection with the battery, are in general use for this purpose—the induction coil with a core shield (the tube of Duchenne) and the sledge induction coil of Du Bois-Reymond. The source of electricity for the smaller induction coils is usually received from a single dip battery (acid potassium bichromate solution), or from an ordinary dry cell, while the sledge induction coil may be fed from a series of batteries, or from the reduced street current. A small transportable induction coil fed by a dip battery or a dry cell battery gives universal satisfaction for the purpose in view, and on account of its cheapness, simplicity and easy transportation it deserves to be recommended.

The faradic battery usually carries three binding posts and furnishes three definite currents. Posts 1 and 2 furnish the mild primary current, posts 2 and 3 furnish the more intense secondary current, while posts 1 and 3 furnish the strong combined current. The latter current is the one which is usually employed for our purposes. The positive metallic hand electrode is held in the hand by the patient, while the negative pole carries the conducting cord, to which a special dental electrode is attached. This dental electrode may consist of a piece of hard rubber in the form of a penholder, with a piece of German silver wire passing through its body. A socket is left at each end for the attachment of the conducting cord and the platinum point. The latter is slightly roughened to carry a small piece of wet cotton; it may be bent to any desired angle. A hard rubber needle holder, with interrupter, as used by the dermatologist for the removal of hair and which may be procured from surgical supply houses, makes a most serviceable dental electrode.

## THE ACTION OF THE FARADIC CURRENT ON THE PULP.

The action of the electric current on a sound tooth calls forth a definite sensation which is in accordance with the normal reaction as exhibited by the patient to electric stimulation. The strength of the current required for this purpose varies with the individual. The perception manifests itself in a peculiar tingling sensation, but not in pain. This point is known as the irritation point. After having established the irritation point in the sound teeth of the patient, and after having expressed it in figures from the markings of the tube of Duchenne, it is a simple matter to distinguish the reaction of a diseased pulp from that of a normal pulp. The following scheme may serve as a guide for making a diagnosis by means of the faradic current:

1. The normal pulp responds to the faradic current at its irritation point.
2. The irritated pulp responds very readily to the faradic current at the irritation point, or just *slightly below* it.
3. The inflamed pulp responds to the faradic current *below* the irritation point. The more severe the inflammation the more ready the response to the current.
4. The inflamed pulp with pus infiltration responds to the faradic current *above* the normal irritation point. The more severe the purulent condition, the less ready the response to the current.
5. The dead pulp *does not respond at all,* not even to the full strength of the faradic current.

To illustrate this diagnostic scheme by figures as obtained from measurements with the tube of Duchenne, the following data may serve as examples:

| | Degrees | Diagnosis |
|---|---|---|
| 1. Upper central incisors | 3.5 | Normal irritation point. |
| 2. First upper right bicuspid | 3 | Pulp irritation.<br>(The tooth shows a slight carious defect.) |
| 3. First lower right molar | 1.5 | Acute pulpitis.<br>(The tooth has a deep carious defect.) |
| 4. Second lower left molar | 7.5 | Purulent pulpitis.<br>(The tooth carries a large compound amalgam filling.) |
| 5. Second upper left bicuspid | No response | Dead pulp.<br>(The tooth carries a large cement filling.) |

### THE TECHNIQUE OF APPLYING THE FARADIC CURRENT TO THE TOOTH.

The positive metallic hand electrode of the faradic battery is held by the patient, or a wet cork or felt electrode is fastened to his wrist. The negative pole carries the dental electrode, which is manipulated by the operator. The current is started at its lowest amperage—that is, the tube of Duchenne is completely pushed over the core, or the sledge is started at zero. The irritation point of the patient is now obtained by holding the dental electrode against any of the apparently sound teeth. The upper central incisors are preferably selected for this purpose. The wet cotton of the electrode is placed near the center of the labial surface of the incisor, but always away from any present filling. The tube is now gradually withdrawn until slight, but distinct, sensation is noticed by the patient. The sensation must never be expressed as pain. The number on the scale of the tube is read, and the same maneuver is repeated on the other incisor. The average of the two readings furnishes the irritation point of the patient under treatment. The average irritation point is not the same in every tooth and in every patient. A layer of thick enamel or a heavy body of dentin requires a stronger current and vice versa, and, consequently, the irritation point in the young is much lower than in older individuals. The condition of the nervous system of the patient may also influence the response to the current; a disturbed psyche is usually much more sensitive to electric stimulation than a normal condition. If the electrode is placed on or very close to a metallic filling in a vital tooth, the response is very pronounced, and even painful, as compared to the same amount of current passing through a tooth without a metallic filling. This is also true if the electrode is placed on a thin shell of enamel which covers a metallic filling. The severity of the shock depends on the size of the filling. All filling materials—gold, amalgam, or the cements, with the exception of gutta percha—are better electric conductors than enamel. The tooth under observation must be dry, and not in too close contact with its neighbors, as the current may switch to those teeth. The close proximity of large contour fillings or metallic crowns deserves special care. In such cases the rubber dam or strips of the dam placed between the adjacent teeth is necessary for isolation. The electrode must not be placed too near the gum line, or the gum tissue will react before the pulp is reached. The sensation felt on the gum is different from that in the pulp. It is not acute, but manifests itself as a tickling or crawling feeling. Devitalized teeth which carry fillings will also react if the electrode is placed on or near the filling; they will not react if the electrode is placed on sound enamel, provided that the root filling consists of gutta percha. If the root carries a metallic post, a prompt shock is felt from the current. If a present filling reaches the gum line, a very quick and painful response is experienced, even from a mild current, when placed in contact with the filling. The absence of enamel acts somewhat similar to the presence of a filling. A shock is usually produced when the current is placed on exposed dentin, which must therefore be avoided. A tooth with a dead pulp, but with a sound crown, will also react to the current if an acute pericementitis is present. Usually, however, a somewhat stronger current is required than that which is necessary to establish the irritation point. In multirooted teeth the pulp may be dead in one canal and highly inflamed in another canal. In such cases a reaction similar to that obtained from purulent pulpitis is usually observed.

The examination of the pulp by means of the faradic current requires a thorough mastering of the many details connected therewith. The practitioner can best familiarize himself with the current by using his own battery and induction coil, and by testing the instrument on himself and on an experimental patient. The teeth, gums, lips and tongue are the organs which should be preliminarily tested. Before testing a tooth for pulp disturbances, it is always advisable to establish, if possible, the irritation point in the corresponding sound tooth of the opposite side in the same jaw. The difference of the recorded figures furnishes the base for its diagnostic utilization. It is understood, of course, that no therapeutic measures have been previously applied to the teeth under consideration or to the general system; their presence would materially influence the reaction of the current.

Before entering into a detailed discussion of the clinical application of the diverse methods of examination, it is of interest to ask: What practical values are derived from a correct diagnosis of the various diseases of the pulp? Some operators make the authoritative statement, with slight modifications, that a pulp in an adult tooth that has been painful for a more or less prolonged period of hours should at once be killed without further consideration, and they regard the diagnosis of the diseased condition of the pulp as being of no practical consequences. The opponents of such rash statements look more favorably on the conservative management of this delicate organ and to them the respective state of health of the pulp is of prime importance in regard to its further treatment.

Let us briefly reiterate what is generally understood by diagnosis. Its object is to enable one to recognize (a) the existing disease by a specific name, (b) the stage and the peculiarities of the disease and (c) the existing or the possible future danger. Applying this very principle to the recognition of the diseases of the pulp, we find that their correct interpretation is of the utmost importance in regard to the future preservation of the teeth. Each definite form of pulp diseases requires specific treatment for its amelioration, and unless we recognize this fact, we do not render the best services to our patients. The object of the practice of dentistry, considering it as a branch of the healing art, is to institute preventive measures, to relieve suffering and to cure disease. These purposes are not achieved by the haphazard utilization of a few stereotyped formulas; they are based on a thorough knowledge of pathology. To illustrate our contention in regard to the diagnosis of diseases of the pulp let us cite a few cases: Without having made a correct diagnosis, arsenic is placed upon a purulent pulp. Practically no results are obtained and the drug is made to carry the blame. Again, arsenic is placed upon a totally inflamed pulp; no correct diagnosis having been made, the result is that the patient will suffer untold agony. Again, the chemical is held responsible for it. A patient has presented himself with severe pain in an otherwise sound upper first molar. After a few routine applications of aconite and iodin are made without obtaining the desired results, it is now decided to kill the pulp with arsenic. Many visits of the patient are necessary and the obligate ''painless killing'' of the pulp turns out to be a barbaric joke and all this expenditure of time, nerve force and money on account of inexcusable pathological ignorance of the practitioner. A diagnostic inquiry would have revealed the fact that the patient suffered from a severe attack of influenza, which, as a consequence, is prone to affect the soft dental tissues.

Regarding the division of the various diseases of the pulp, the nosology, quite a confusion is apparently existing in our current literature, even our text books, unfortunately, do not enter into a detailed discussion of this interesting subject. But, not alone this laxity of pathological inquiry is appalling to the searching student, he is also confronted with a gross neglect of correct pathological terminology. Hyperemia, inflammation and gangrene are the usual terms employed to designate all the various types of pulp diseases. Inflammation is often referred to as a ''disease,'' while it should be classified as a symptom of such. The collective term pulpitis is generally utilized to express all stages of inflammation of the pulp. And, again, pulp gangrene, a term which is utilized to cover all phases of dead pulp tissue, is referred to as a ''disease,'' while, in reality, it is only the sequence of necrosis, viz., the necrotic pulp is acted upon by specific microorganisms which results in gangrene. It is but common sense that a ''dead'' pulp cannot become ''diseased.'' Unfortunately this same wrong conception of necrosis and gangrene is prevalent in many of the recent works on surgery.

From a purely pathological point of view, Arkoevy has probably presented, so far as known, the most subtle division of this subject. For clinical purposes, however, his division is too complicated. Many other classifications have been brought forward, and among these we may cite the classic schemes of Rothmann and of Black and those of Wedl, Abbott, Boedecker, Burchard, Roemer, Walkhoff, Hopwell-Smith, Colyer and others. To construct a system which answers all purposes equally well is largely a matter of personality. However, there are certain unalterable facts which must be utilized as a foundation for all classifications. Ordinarily, we refer to a sound, healthy pulp as a normal pulp. This very term, however, needs some further explanation. The tooth pulp is a transitory organ. Normally, with the completion of the tooth, its destination is accomplished and from that period on retrogressive changes take place within its own tissue which may, under suitable conditions, lead to complete atrophy or the many forms of degeneration. At another period, however, its activity as a constructive organ is called upon after the normal calcification of the tooth is accomplished; partially as a result of external stimulation for the purpose of protecting its own integrity by depositing secondary dentin and partially from some unknown factors of overstimulation resulting in the formation of pulp stones. As it is a very vascular organ and richly supplied with nerve filaments, any disturbance of its integrity will manifest itself in the typical reaction of any tissue to an injury, viz., inflammation.

In the following scheme it has been our aim to formulate a classification of the diseases of the pulp from the viewpoint of clinical pathologist. Its object is to present a working basis for the *ultima ratio* of all clinical procedures, i. e., the application of rational therapeutic measures, in the broadest sense of the term, for the purpose of relieving disease.

### DIAGRAM OF CLINICAL DIAGNOSIS OF DISEASES OF THE PULP.

I. Hyperemia.
II. Pulpitis.
  (a) Acute pulpitis:
    (1) Acute simple pulpitis.
    (2) Acute purulent pulpitis.
  (b) Chronic pulpitis:
    (1) Chronic ulcerative pulpitis.
    (2) Chronic hyperplastic pulpitis.
III. Necrosis and gangrene.

The various factors which are at our disposal, and which, as a whole, make up the diagnosis of a specific form of disease of the pulp, depend almost entirely upon the antecedent history, the anamnesis, and its subjective symptoms. The history of the case under observation, including a fair conception of the kind of pain as subjectively expressed by the patient, and the objective examination of the present state are the usual preliminary steps in a diagnostic inquiry. The patient should be interrogated by a set of routine questions, as for example: Has the tooth ached? How long? Is the pain continuous or of a short duration? Does hot or cold water hurt? How about sweets when taken into the mouth? Is the tooth painful in closing the jaws? Does it feel longer than the others? Does the pain increase on lying down? If the tooth is filled, additional inquiries are necessary, viz., Has the tooth been painful before the filling was placed? Did it pain during filling or soon thereafter? Was the "nerve" destroyed? Depending on specific conditions, as for instance, the presence of acute febrile diseases, especially malaria and influenza, or anemia, menstruation, gastation, etc., other questions, of course, will suggest themselves.

Before relating the symptoms of pulp diseases it is probably not amiss at this moment to reiterate the various causes thereof. Without entering into a detailed description of these etiologic factors the simple depiction of a scheme, as outlined by the late Miller, has been extremely serviceable, and when once permanently impressed upon the memory, materially helps in arriving at some fixed conclusions which will be of paramount value as a diagnostic aid.

THE CAUSES OF PULPITIS.

| | | | |
|---|---|---|---|
| Pulpitis. | Primary.... | Causes of a mechanical nature. | Traumatism, abrasion, calcareous deposits in the pulp, fillings, direct or indirect, correction of irregularities, separation of the teeth, etc. |
| | | Causes of a chemical nature. | Acids, sweets, poisonous bacterial products. |
| | | Causes of a thermal nature. | |
| | | Causes of a parasitic or mixed nature. | |
| | Secondary.. | Causes starting from the pericementum. | |
| | | Causes as a sequence of general diseases. | |

The appended description of the diagnostic signs of the various types of pulp diseases does not claim to be exhaustive in any degree; in a short paper of this kind only the most salient features can be enumerated.

*Hyperemia* of the pulp is a disturbance which is most frequently met with in the routine practice of dentistry. As we have stated above, not every form of increased reaction to temperature changes should at once be classed as a local pathological disturbance; it may occur as a sequence of lowered resistance in general or the specific tooth may be the point of lowered resistance on account of a previous insult or other possibilities. A mild hyperemia is not necessary always of a pathological origin. If, however, the subjective pain in the tooth under observation is induced by heat or cold is of a sharp, lancinating character, lasting for some minutes, and leaving the tooth with an uneasy, dull feeling for some little time thereafter, we are reasonably sure that an acute hyperemia of the pulp is present. If the tooth should have a cavity, the condition of the layer of dentin intervening between it and the pulp is of prime significance. Should this layer be of a sound, normal structure, one may be reasonably sure that no microbal infection has as yet penetrated through it, while if the structure is decalcified, one may expect that the existing hyperemia is merely the initial stage of a forthcoming inflammation. If on filling the cavity temporarily with a gutta percha preparation the tooth shows no further reaction to ordinary temperature changes, acute hyperemia may safely be diagnosed. Chronic hyperemia is most often found in those multirooted teeth where senile atrophy has exposed a root more or less complete, as for instance, the palatine root of the upper molars. Acute forms of hyperemia as a result of general disturbances, viz., influenza, malaria, scarlet fever and other infectious diseases are frequently met with. In addition, in typhoid fever a pinkish discoloration of the tooth crowns may sometimes be observed as a result of rupture of the capillaries in the pulp. Inflammation of the mucous linings of the nose and its accessory sinuses are often accompanied by severe pain in the upper teeth on account of their close anatomical relationship. In diabetes and syphilis, the pulp and the pericementum are often attacked simultaneously, usually resulting in their complete destruction, while in locomotor ataxia the sclerotic changes in the nerve tissue are frequently productive of a "painless" death of the pulp. True neuralgia of the tooth pulp is rare, although reflex neuralgia is often met with. A sharp lookout for hidden caries and impacted teeth should be made in all cases of supposed dental neuralgia. Pulp stones, which are a very common occurrence, may, by their slow increase in size, cause a form of hyperemia which closely borders on acute inflammation. It is claimed that pulp stones are the "painful" factors when a patient complains of severe paroxysmal pain in an otherwise sound tooth, and when the tooth is extremely sensitive on tapping during the cycle of pain, but this sensitiveness has to pass off immediately after the paroxysm ceases. The X-ray picture as an aid in diagnosis in these cases is of the utmost value. The tooth pulp is normally encased in a hard, unyielding mass of solid dentin and it fills the pulp cavity complete. As a consequence, in hyperemia and its sequences, which means, pathologically speaking, progressive changes from stasis to the exudation of plasma and fixed tissue elements from the blood vessels into the surrounding structure, an enormous increase of pressure on the nerve fibers occurs which naturally results in pain and, incidentally, hastens the involvement of adjacent tissues. The pain from an inflamed pulp may occasionally be so intense as to be classified among the severest forms of suffering which human flesh is heir to. A hyperemic pulp will respond painfully to the electric current slightly below the normal irritation point.

*Acute simple pulpitis,* like all further variations of inflammatory changes of the pulp, is, in the greatest majority of cases, due to bacterial invasion. It should be borne in mind, however, that an inflammation may be caused by purely mechanical, thermal or chemical irritation without the invasion of bacteria, and that aseptic inflammation with aseptic pus may be the result. Ordinarily the apex of the cone-shaped carious defect will involve a horn of the pulp, while in a rapid, penetrating caries the primary focus of attack may reach the pulp at any point near its lower surface. Acute simple pulpitis may exist in two typical forms, viz., as a partial or as a total pulpitis. The differentiation between these two types of inflammation, which is merely a matter of degree and not of kind, requires subtle diagnostic skill for its correct interpretation. Partial pulpitis, according to our conception, always precedes the total involvement of the pulp. In acute simple pulpitis the pulp is usually not exposed. If we accidentally, or by intent, remove the thin, more or less decalcified layer of intervening dentin, the densely hyperemic pulp can be seen as a mass of dark red tissue in which the rhythm of pulsation will be readily observed. In partial pulpitis the pain is fairly localized, while in the total forms it may assume a diffuse character. It is of a sharp, lancinating character, and the paroxysmal attacks may last accordingly for hours and days. Severe irritation, but especially when cold is applied, is painfully recognized; in the progressive stages of the disease heat is also usually painfully noticed. The percussion sound of a tooth with a partial pulpitis is not altered since the pericementum as yet is not involved; in total pulpitis, however, the tooth may be tender to the touch about the apex or the crown, and it may be slightly elongated from its socket as a result of the disturbance of the pericementum about the apex. Occasionally pain may cease spontaneously, probably as a result of sudden death of the pulp from strangulation. If the pulp is pricked with a sharp point, a few drops of venous blood quickly flow from the wound. An electric response is readily obtained from a tooth containing an inflamed pulp, it will always be found to be below the normal irritation point. The more severe the inflammation the less current is required./

The *purulent* forms of *pulpitis* are more prone to occur in filled teeth. An overlooked minute opening into the pulp chamber or insufficient excavation of the infected dentin in deep seated cavities prior to the process of restoration are the usual gateways for the infection. The pain is of a dull, diffuse character and is not materially altered by temperature changes. The patient may not be able to locate the painful tooth and, sometimes, not even the side of the jaw in which the pain is felt. Increased influx of blood, as on lying down, violent exercise, by coming from the outside cold into a heated room, or other sources which increase the blood pressure, augment the pain perceptibly. The degeneration of the pulp tissue is principally manifested near the primary point of infection. Localized abscesses, either single or multiple, are often observed in extracted teeth afflicted with purulent pulpitis. By entering into a purulent pulp with a drill, the removal of the latter is always immediately followed by the welling up of pus and the primarily existing severe pain is quite often at once relieved. In most cases of purulent pulpitis, by way of continuity, the apical tissues of the affected tooth are involved, resulting in acute or chronic pericementitis, with their sequences, viz., abscess, fistula, etc. Depending on the progress of the purulent involvement, a more or less strong electric current is required to bring forth any response. The current required is always stronger than the one which is necessary for establishing the normal irritation point in a similar tooth of the same patient.

In *chronic ulcerative pulpitis,* the *sine qua non* is the exposure of the pulp. Room for expansion and drainage of the pulp are necessary for the full development of this stage of the disease. Ordinarily the patient complains of little pain, since the primary factors for its causation—swelling and resultant pressure from being enclosed in an unyielding wall of dentin—are removed. When food particles or other substances are crowded into the cavity, a momentary paroxysm of diffuse pain may occur. Temperature changes, as a rule, do not cause appreciable reactions. The arteries and veins are permanently distended, accompanied by degenerative changes in the nerves. The pulp tissue proper usually undergoes necrobiotic changes with ulceration near the line of demarcation—phlegmonous destruction—or it may become atrophic. Sometimes one observes an increase in the connective tissue elements. Chronic pulpitis may perhaps always be regarded as the sequence of some primary acute attack; it is principally confined to bicuspids and molars. Depending on the progress of degeneration, a more or less strong electric current is necessary to establish a response from the pulp.

*Chronic hyperplastic pulpitis,* commonly referred to as pulp polypus, or hypertrophy of the pulp, is caused by the continuous irritation of the paranchymatous structure of the pulp by the rough edges of the perforated pulp chamber. From a pathological point of view, the new growth should be looked upon as a neoplasm of the granulomatous type. These little tumors, being composed of dense, connective tissue, usually spread over the entire cavity; they are principally found in the bicuspids and molars. Hyperplastic pulp tissue is practically free from nerve elements but rich in blood vessels. Consequently they do not react painful on being irritated, but they bleed very freely. Apparently they inconvenience the patient but little. These neoplasms are more or less pedunculated, the stem being rather short. The pulp itself is almost always found in a high state of chronic inflammation and extremely sensitive to the touch. In diagnosing these new growths, care should be exercised in not confusing them with hypertrophic gum tissue, which may have grown into the cavity. From the above description the diagnosis of a chronic hyperplastic pulpitis is a comparatively simple procedure.

*Necrosis* and *gangrene.* While we realize that in its strictest sense necrosis and gangrene have no place in the nosology of the diseases of the pulp, nevertheless they form clinical entities which possess specific diagnostic features and their enumeration is called forth at this moment so as not to interrupt the chain of pathological evidence. At the outset we should remember that necrosis and gangrene are two distinct types of tissue death *in situ.* The former may result from any cause, while the *sine qua non* of gangrene is necrosis *plus* saprophytic infection. Unfortunately, in surgical pathology both terms are frequently badly jumbled, as for instance, in the erroneous expression, carbolic acid gangrene.

Necrosis of the pulp is frequently met with. A pulp may be dead for months without causing any disturbance. It may be discovered on examining the teeth of a patient without the latter having any knowledge of its existence. The tooth under observation is often more or less discolored, hot or cold produces little or no reaction, the translucency has usually become dulled, but the safest diagnostic aid is the electric current. A necrotic pulp does not respond to even the full current of the ordinary battery. The pathological types of pulp necrosis, viz., coagulation, colliquation, caseation and mummification play no part in the diagnosis proper.

Gangrene of the pulp, as stated above, necessitates microbal infection of the necrotic tissue. It is immaterial whether the infection reaches the dead pulp through a cavity or via the circulation. Its diagnosis is based on practically the same points as necrosis with this important addition: An intense foul odor, and if there is no opening into the pulp chamber, more or less severe swelling of the gum and the surrounding tissue, often including a part of the face, and pain. In fact the pathological picture often presents a diffuse purulent pericementitis or periostitis. There is no response to the current except in such cases where necrobiotic changes are still going on, viz., where a part of the pulp may still show vital reactions. These possibilities are primarily found in multirooted teeth. Gangrene always presents a semi-liquid mass of dirty, grayish or black debris with the typical putrescent odor, due to the formation of hydrogen sulphid, ammonia, fatty acids and other odoriferous compounds. The autolytic dissolution of the dead pulp tissue is caused by the action of the ferments liberated from the leucocytes; the bacteria only play the role of important biological agents in this process. The so-called dry gangrene differs from moist gangrene in so far as it is *not* gangrene, but mummification necrosis.

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## DISCUSSION.

Dr. W. H. Whitslar, Cleveland: The admirable paper read by Dr. Prinz is very thorough and authoritative.

Indeed, we must look upon Dr. Prinz as one of the best scientists of our profession, and we must look to him for accurate chemical and pathological experimentation.

In his paper we observe that he offers valuable hints as to diagnosis. It requires no keen observation to see that with the advancement of knowledge in dentistry diagnosis is becoming easier, apparently.

It is of less difficulty to the diagnostician who has cultivated an acumen by his own knowledge and efforts to gain the facts by clinical experience. So, when remarking that diagnosis is easy it was qualified by the word "apparently," for as already stated, the power of diagnosis is gained only by hard work. It is true, however, that there is inborn in some individuals an instinctive process of reasoning that allows penetration of the processes of nature which in other persons does not awaken that sympathy.

We hear sometimes of those who have been the seventh son or daughter of the seventh child, but to these penetraters of mysteries we give no special credence, for success in any attainment costs great expenditure of both time and money. Now, this opens up the question of the terms of this knowledge. The price may be little or great. It will depend upon the quality of the goods. When a consultation is held in event of sickness, the expenditure of money for information does not compensate for the knowledge in proportion to the expense of securing that information in the first place, hence the cost to the purchaser, so to speak, is less because the same knowledge may be given again under similar circumstances providing judgment leads the owner to give it at the right time. Knowledge means more than mere learning; it requires its use when opportunity needs it. This is what a diagnostician purports to know and give, and his services are worthless if he is not fortified with preparation.

. Dentistry is the science of the treatment of but a portion of the body. It is so important that it leads to limitless good by reason that the dental organs, being a component part of the body, they are subject to its physiological activities.

Knowledge in dentistry is constantly widening and disease is being studied as never before. Why? Because the science of chemistry, physiology, histology and bacteriology have been clearing the avenues, showing more clearly the places to ballast the broken road and switch the filth toward proper channels of egress.

With the privileges of study that are now being given in institutions of learning where specialists have given their life's work to the unfolding of the truths there must necessarily come the cost of payment for such information by the one who has not had opportunity to learn for himself.

As specialists we cannot estimate the cost to ourselves of our fitness to give valuable information, and it is much less realized by the laity. The difference between health and disease is often unrecognized, giving rise to uncertainties. A case will illustrate my meaning: A lady consulting for disease of the antrum of Highmore that had been existing for several months, it was found on inspection that there was no disease, but that a plug of cotton which had served to keep the antrum open during previous treatment of the disease was acting as a thorn in the flesh, and is removal was the signal for closure of the wound and end of the difficulty.

The original trouble had long disappeared. It requires an insight to the natural condition of tissues before we can distinguish deviation from it. Dental diseases are generally so expressive that it enables one to make a decisive diagnosis without a great deal of experimentation. As the sciences are becoming more exact so are the facilities for rapid diagnosing of disease. Analysis of saliva is being more utilized and blood tests as well as investigation of other fluids of the body impart testimony that formerly required much time in clinical experience to determine. Perhaps the one most common disturbance that we meet with is odontalgia. What a question it is to be asked, ''What is a remedy for toothache?'' Someone has said that pain is pain, but there are different kinds of pain, and pain in a tooth has different causes.

Dentists seek the cause, then a remedy is prescribed for the pain. Odontalgia may sometimes be relieved by quinine, but more often it would effect no impression. A little knowledge is a dangerous thing, but much knowledge in the practice of a profession that demands relief of pain and restoration of functional powers is of great advantage.

Critically observant, the dental specialist has a great field to analyze. From the moment the patient arrives in the office sensations of a new force dawns upon the patient and dentist. This emanates from the deportment, temperament and conditions of health kept in mind by the dentist when he examines the mouth of the patient. Now he studies the contour of the face, and particularly the jaws, in their relation to the whole physiognomy.

We observe the lips and jaws; these, when parted, expose to view the oral cavity with its array of teeth, muscles, mucous membranes with its orifices of salivary ducts, the tongue, and all the disease possibly that may affect the tissue.

Surely the field of work is great. Dentistry is confined principally to the teeth. The construction of the teeth denote their use, and lack of care results in great damage to the economy of right living.

It is correcting this laxity of care with which the dentist has most to do. Not only are his efforts being appreciated and extended, but enterprising makers of dentifrices are doing good by timely advertisements in the press and elsewhere, when he who runs may read that a dentifrice is good for bad teeth, and not bad for good teeth.

To sum up diagnosis in the mouth: Examine the mucous membranes to notice the color and infiltrations from disease; the tongue, its coatings to diagnose intestinal disturbances, also the movements of the tongue to note nervousness; the gingivae as indicators of disease of peridental membrane; and finally, the teeth that are present and the necessity of supplying the absent ones, or correcting those that are irregular.

It is always important to remember the functions of the teeth and to know what their component parts are used for. This applies also to the peridental membrane which supports the tooth in its place in the jaw. As there are so few pathognomonic signs of disease in the mouth diagnosis is by differentiation or exclusion largely, therefore, clinical function of dental pulp and peridental membrane, namely, the senses of sensitiveness to thermal changes and touch respectively are factors not to be unthought of in our determination of disease of the organs.

Dr. Prinz has so thoroughly gone over the various conditions of the dental pulp it would be superfluous to add further. As he has well said, the personality of the investigator often proclaims the nomenclature of the diseases of the pulp. Whatever condition is recognized by the practical dentist, the main question is the relief of pain, and then subsequently either saving or destroying the pulp. This requires skillful knowledge in either direction, and even then we all fail sometimes. People die with the best of medical treatment, why not a part of their bodies, the pulp which is in reality a transitory body?

With disease of the pulp we have been dependent largely upon the subjective symptoms. If the pulp is so exposed as to see the pulsations of the beating vessels, I have no doubt there would be little hesitancy in devitalizing it rather than attempting a ''flap operation'' as was advised years ago by Dr. Hulihen, to remove a circumscribed area of purulent tissue.

There are few objective symptoms. A slight elongation of the tooth from its socket, due to inflammation extending from a complete pulpitis, is imperceptible only to touch or by the words of the patient.

The best exposition of the value of percussion ever given is in Boedecker's "Anatomy and Pathology of the Teeth," page 283.

Percussion is valuable only when pericementum is involved. The value of the skiagraph in diagnosis has been mentioned by Dr. Prinz as a test for pulp stones. Dr. Weston A. Price, of Cleveland, who has no peer as an authority on skiagraphy of dental tissues, states that fifty per cent. of the cases of pulp stones only are recognized as such.

I am glad that Dr. Prinz has fully explained the use of the faradic current in diagnosing conditions of the pulp. To me this method has been the most satisfactory means to learn of the vitality of the pulp, and the quickest.

The greatest failures with it are in multi-rooted teeth in which vitality remains in one root, but this is not serious because it is better to anticipate disease by finding the pulp of the tooth partially disabled and removing its dead or dying portions. Another difficulty is to sometimes prevent the current being conveyed to the gums by fillings. So we may see in all these methods, at times, failures.

The paper is so complete in details that I must sincerely recommend its careful reading as soon as it is printed.

Dr. David Stern, Cincinnati: The universal interest taken in oral hygiene at present makes the excellent paper which Dr. Prinz has given us one of great importance, and it is so exhaustive that there is no ground left to be covered. As a correct diagnosis is almost a cure, nothing can be of greater importance to us than to properly ascertain the causes of dental pulp diseases. Fortunately there is more literature on the subject at our disposal than formerly, and new works on oral hygiene are appearing at short intervals, at least three having appeared within the last few weeks. For years we were in the habit of depending upon a few tests to diagnose cases, applying these in all instances, resulting in our meeting with so many failures in treatments. Formerly many teeth were lost which today could be saved without much difficulty.

Without being able to go into details of the paper at length, I will repeat a few points which we have heard, and which will prove of great value to all of us, especially the various physical tests of the tooth, viz., color, translucency, conductivity of temperature, percussion, sound, etc., and also to the conclusions to which these tests lead. One test especially has been of much value in recent times, and that is, the test of transillumination of the tooth, by means of the electric mouth lamp, may form a fairly reliable shadow picture of the living pulp.

It is also a good suggestion that the heat test is serviceable, but by no means absolute, for a diseased or dead pulp does not respond in the same manner as a tooth with a normal pulp. We usually place too much reliance upon the response to the effects of thermal changes. The application of a few drops of formaldehyde solution in a deep seated cavity, as suggested by "Preiswerk," is very interesting, for formaldehyde, applied in its commercial form, can produce pain where it had not existed before. At present we are getting most excellent results by the use of the X-ray, which gives us shadow pictures of the presence of foreign matter, without putting the patient through the long series of visits and of endurance, while old fillings are being removed or tooth structure drilled into (and generally not without pain), in search of the causes of the irritation. The essayist makes the correct statement that a well trained eye is required to interpret pictures of this nature, inasmuch as the beginner is apt to see things which are often imaginary.

Having had no experience with the use of the electric current for diagnostic purposes, I will not say anything upon this subject, but hope to learn much concerning it before the end of the present meeting.

It may be well to repeat what has been said concerning what is generally understood by "diagnosis." Its object is to recognize: (a) The existing disease by a specific name; (b) the stage and the peculiarities of the disease; (c) the existing, or the possible future, danger. As a result of this the essayist tells us that the object of the practice of dentistry, considering it as a branch of the healing art, is to institute preventive measures, to relieve suffering, and to cure disease. As stated, as an example: Without a correct diagnosis, arsenic is placed upon a purulent pulp. No practical results are obtained, and the drug is blamed. Again the arsenic is placed upon a totally inflamed pulp, no correct diagnosis having been made, with the result that the patient suffers untold agony, and again the chemical is blamed. An investigation into the cause of the inflammation of the dental pulp revealed the fact that the patient had suffered from an attack of influenza, which also affected the soft dental tissues. This shows the necessity for dentists to have had at least some little training in pathology.

We also are told of the gross neglect of correct pathological terminology, the use of terms ''hyperemia,'' ''inflammation'' and ''gangrene'' being given as examples of those usually employed to designate all of the various types of pulp diseases. The term ''inflammation,'' so often termed a ''disease,'' should only be used as a designation of a ''symptom'' of a disease.

We must not overlook the simple diagram of the clinical division of diagnosis of diseases of the pulp into three simple classes: (1) hyperemia, (2) pulpitis (accute and chronic), (3) necrosis and gangrene, and also the simple arrangement of the causes of pulpitis by the late Dr. Miller, which is of great assistance in diagnosis.

The description of these causes, as explained to us in the paper, show much careful study of the subject and will serve as a fine work of reference.

All I care to say further, is that the work of the investigators in our profession is just beginning to receive its proper recognition, and it is men on the order of our essayist who have contributed so much to bring this about.

**Dr. L. E. Custer**, Dayton: The first part of Dr. Prinz's paper deals with the more pronounced pulp lesions which are easily diagnosed by temperature extremes, by percussion, by medicinal agents or by a strong light. These are conditions which I might call the results of a previous chain of retrograde changes. In other words, we have been dealing with far-away results, for except only in well marked isolated cases of teeth standing alone have we heretofore been able to diagnose hyperemia of the pulp or any of the first changes from the normal pulp. We have been accustomed to speak of this stage as *inflammation* of the pulp, whereas owing to the complete encasement of the pulp within unyielding walls, there can be no such thing as inflammation of the dental pulp, for one of the marked symptoms of inflammation is swelling, and this cannot take place in an unexposed dental pulp. The real aim of the paper, as I see it, is the diagnosis of the very first changes that go on in the chain of changes which lead to a dead pulp. We have heretofore been able to recognize only the last of these changes, the result of the first set which we could not diagnose at the time.

We all recognize that to tell the moment a pulp becomes hyperemic is a fine distinction to make. There are so many degrees of hyperemia that there is no distinct line between the normal and the abnormal. But here our essayist makes use of that wonderful agent which has already done so much for mankind—electricity—for diagnosing the several lesions of the dental pulp. The appliances are quite simple—in fact an old cataphonic electrode and an ordinary faradic battery is all that is necessary.

While I have not myself tried this method, and, therefore, may not have the right to criticise, I, however, cannot quite harmonize some of the statements with what we have observed in cataphoresis. He says, ''The wet cotton of the electrode is placed near the center of the labial surface of the incisor, but always away from any present filling.'' The current is thus expected to pass through sound enamel. Now in cataphonic work we found that the enamel of a tooth is as much of an electrical insulator as so much porcelain. If that is true, how can an electric current of such low potential pass through the enamel. Is there any special merit in an interrupted current over a constant current when used in this way and for this purpose? We would infer from the paper that there is no difference, for in the beginning he says, ''The kind of electric current best suited for our purpose is the combined faradic current, although the reduced direct current may be employed with equal success.'' Now the latter current is just what we use in cataphoresis and I have never been able with the voltage used for that purpose to get any response when the electrode is applied upon the enamel unless there was leakage to the gum or through a metal filling.

Let me quote from a former paper of mine, ''The Electrical Aspect of Cataphoresis,'' read before the Mississippi Valley Dental Society in 1896: ''The enamel consists of about 97% lime salts, which is a non-conductor of electricity, and the remaining three per cent. is such a small amount that it offers so much resistance as to be practically a non-conductor. This fact that a sound tooth is covered with a non-conductor of electricity may have a wider significance than we at first thought would allow, and it may have a physiological significance as well. At any rate, the fact that enamel is a non-conductor of electricity is an important consideration in cataphoresis.'' While these were my words in 1896, they have been verified by every dentist who used cataphoresis for anesthesia of the dentine. Now, where is the discrepancy? Dr. Prinz recommends the faradic current as obtained from the ordinary medical battery outfit. This current is quite different from the direct current. It is just half way between the direct and the alternating current. The direct current may be represented by a straight line and the alternating current by a succession of waves which rise above and then sink below an average base line, whereas the faradic current is represented by a succession of waves rising above and returning to the base line. The alternating and faradic currents are practically the same in their phenomena. They both produce induction effects. The alternating current is highly irritating to nerve tissue. It is this current that is used for electrocution. A low voltage of this current is many more times dangerous than a direct current of the same voltage. As a matter of fact it was a demonstration of the underlying principle of an interrupted current that caused Galvani to investigate the cause of the twitching of freshly dressed frog legs as they dangled on an iron grating and occasionally came in contact with a cross-bar of metal which formed the conditions for an electric current.

The only explanation satisfactory to myself that a faradic current passes through sound enamel, if it does, as Dr. Prinz claims, is that the peak of the wave is of very high potential, much higher than could be safely employed with a direct current; and although enamel is a non-conductor of electricity, as it is ordinarily understood, we well know that there is no substance that is a perfect electrical insulator, and at the peak of the wave the resistance of the enamel may be broken down by the faradic current. Is this correct?

If it be true that the faradic current, even from a small medical coil, will pass through sound tooth enamel, I then agree with all the doctor has said as to the fine distinctions that can be made by its use, and I believe that we have in this method one of the most valuable aids in diagnosing the first changes in the dental pulp. One of the symptoms of a dying pulp, as I have observed, and which was not mentioned by the author, is the sudden attack of a sharp shooting pain which disappears as quickly as it comes on. Often times this is brought on by a sudden movement of the head. No particular tooth can be pointed out at this time as the cause. These symptoms become more frequent, until after from one to three weeks the tooth responds to the heat test as the first positive sign as to the affected tooth. Now, it is also in such cases that this method would be of great value.

The paper refers briefly to the relation of influenza to the pulp. During an epidemic of this disease, some years ago, there were so many cases of dead pulps just preceding the attack that with me these teeth became a diagnostic sign as to the on coming of the attack. The pulps of apparently sound teeth would die without any apparent cause and the next few days the patient would recognize that he had influenza.

The latter part of the paper treats of the several pathological conditions of the dental pulp and their diagnosis in such a classical manner as to admit only of praise and commendation.

Dr. Prinz (closing): Regarding the use of the electric current, it seems to me that the only way to do is to get a small battery—the one which I have cost $3.00—and Dr. Custer says that if any of you have an electric outfit, utilize it in this way. Familiarize yourself with it first. The current can get out of order. If it does, it is simply because the battery went out. The rest of the apparatus will last a lifetime. If you use an electric outfit I am sure you will do much better work.

I had the good fortune to be here last year, and Doctor Callahan was kind enough to insist that I be here again this year, and I want to thank you for the attention which you have given me.

## INSTRUMENTATION IN PYORRHEA ALVEOLARIS.*

BY AUSTIN F. JAMES, D. D. S., CHICAGO, ILL.

THE SUBJECT I am presenting is old and has been much discussed, but to me there always has seemed an assumption in what had been said, that instrumentation is a matter of minor importance, and a thing requiring only ordinary ability to accomplish.

Your essayist takes an opposite view of instrumentation in pyorrhea, and believes that there is no part of dentistry which requires greater skill and technic, or one where the personal adaptability of the operator has more to do with obtaining successful results. There has been no definite system or method of instrumentation adopted by the average operator; hence the results obtained have been just as indifferent as the method; and until every dentist attempting this work learns some more definite method there will be no uniform results in the treatment of pyorrhea alveolaris.

The writer of this paper contends that to be successful in this treatment, the operator must have developed or been taught some definite system of instrumentation that will make it possible not only intelligently to remove deposits of calculus from the root surface, but also to remove the dead pericemental membrane, exposing the root surface, without making scratches or grooves with the instruments. Also, he must have left a smooth root surface, without removing more than the outer layer of the cementum, under which will be found a denser cemental layer, which if not gouged or roughened by instruments, will afford a protection from further bacterial assaults and will allow the overlying gum tissue to settle closely about the teeth, preventing the lodgment of fermenting substances or the packing of food into pockets by the force of mastication.

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*Read before the Ohio State Dental Society, Dec., 1912.

Successful instrumentation also involves the smoothing of all exposed tooth surfaces, such as etched gingival enamel margins or broader surfaces of enamel, which are affected by superficial caries as a result of the lactic acid from fermentation held in contact with the enamel by mucous placques.

To those of us who read dental literature, as it is presented from month to month in our journals, and the frequent publications in book form, we can see that much is being said of oral hygiene, oral prophylaxis and the treatment of pyorrhea alveolaris.

I am not ambitious to burden the literature of these subjects, but I am forced to ask myself the question: "What does it amount to unless each individual dentist learns to adopt some practical and proved method?"

There is danger that the public is learning to expect far more than dentistry, in general, can supply. Oral hygiene and oral prophylaxis mean neither more nor less than preventive treatment. But are the usual methods preventive? They are not. Better conditions will not prevail until there is some system of procedure established which will bring about definite results, by which I mean that all mouths must be restored to a healthy condition.

Even in dirty healthy mouths teeth do not decay except in the deep fissures or their foci which form the natural markings of the teeth; and it is a part of the preventive treatment to protect these deep markings before general infection begins. Fermentation is the cause of almost every pathological mouth condition and its principal cause is lack of friction; since all human food is measurably soft, the teeth and gums receive no friction from mastication. What is the result? Gums become thickened and loosened about the necks of the teeth, offering lodgment for food particles which are not brushed away, and the heat, moisture and air provide a favorable environment for the fermentive process to begin. This produces glutinous or mucous placques on the teeth and gums, and the result is an irritation of the soft tissues with possible decay of the teeth. These are mechanical conditions in the early stages and succumb only to a mechanical corrective process, and this cannot be accomplished with antiseptics or tooth pastes. Any enamel surface showing green stains or heavy mucous formations will be etched or roughened by the dissolution of the cementing substance from around the enamel rods. The roughened surface consists of the ends of enamel rods standing exposed. A tooth with normal pulp conditions and sound enamel does not discolor, all stains showing on sound teeth are in the mucous or glutinous substance on the surface of the tooth and are not a discoloration of the tooth itself. When patients return in a few weeks, saying, "My teeth are as bad as ever," it is not carelessness on their part, as is often assumed. The fact is, that the enamel surfaces are roughened and a general state of fermentation exists, making it impossible to brush the teeth clean.

The most suitable instrument for pyorrhea and prophylactic work is one which carries out the principle of a push-and-pull plane. Using the tooth as a fulcrum for the shank of the instrument both the forward and backward strokes of the plane over and around the root cut very delicately and leave a smooth, even surface.

In attempting a description of the instruments which I use myself and recommend for the use of others, I wish to emphasize particularly the theory upon which they are constructed. First, I regard as essential the push-and-pull action of the plane which enables the operator to clear away any foreign deposit without being forced to go beyond it and invade a region where healthy tissue may be injured. Second, and of equal importance, is the two-point support of the instrument upon the tooth. This prevents any scoring or roughening of the tooth and restricts the work of the plane to a purely smoothing action, leaving, to all intents and purposes, a highly polished surface against which the gum will retract closely and exclude all fermentative agencies—the ultimate purpose of all alveolar or prophylactic treatment.

Each set consists of 144 instruments, divided, first, into 18 groups of 8. This division is based upon the position of the planing surface in relation to the operator with each of the 8 planes occupying one of the 8 divisions of a circle; in other words, each plane is turned upon its long axis precisely 45 degrees from its neighbors.

A second aspect divides the instrument into three sets of 48, wherein straight, concave and convex shanks form the bases. This is to accommodate the instruments to any conceivable shape of tooth. From a third viewpoint, the division is in two parts, a greater and a less angle, which relates to the positions of the teeth in the mouth. And a fourth division is in the lengths of the shanks—three different lengths—to apply to all sizes of teeth.

The objects of these apparent complications are to furnish a proper instrument for any shape, size or position of tooth and provide the two-point contact for the instrument which is the true secret of the planing operation and without which no successful results can be accomplished.

The working end of the instrument is blunt, with the planing head formed at right angles to the shaft or shank, honed flat on the surface, which is to plane the tooth. The outer and inner walls of this head are perpendicular to the surface that planes the tooth, thus presenting sharp square edges which effectively plane off any foreign matter and polish the tooth without the possibility of gouging or cutting it in the very least.

Since the plane has no wedge-shaped edges, and the shoulder at the bank of the extreme end is somewhat rounded, it is used to remove the innermost portion of the calculus or deposit without any injury to the healthy membrane. Also, the outer corners of the blade are slightly rounded, so that if a slight lateral twist or turn of the shank should occur while the implement is in use, the corners will not gouge or groove the teeth.

As the square working edges of the instrument are at right angles to the plane bearing surface and to the shank, it is practically impossible to tilt the shank upon the root so that the edges will injure the surface of the tooth.

I do not suppose it is possible that I have made myself clear in the description of this push-and-pull two-point contact planing instrument, but I wish to show that it is necessary to have a definite system of instrumentation before it can be hoped to do this work intelligently.

It is not my intention to say that successful work cannot be done with any other particular set of instruments in the hands of a skillful operator; but I maintain that the ordinary scraping and filing instruments are often a cause of injury to the very root which we are attempting to benefit. With these scraping and filing instruments, of which the cutting edges are the only points in contact with the tooth, the delicacy of touch cannot be attained which makes it possible to locate the small particles of deposit and know when they have been removed. Both with men whom I have watched use such instruments, and in my own hands, it has seemed to be an operation of bull-headed determination to remove the deposits, trusting to luck for smoothing the root, which is the final object to be gained.

To illustrate this point, I will cite an incident which occurred following one of my clinics. An exchange of ideas with a fellow practitioner resulted in an invitation to visit his office and see some of his cases. I was shown some unquestionably successful results, work that any man might be proud of having done. The instruments used in this work consisted of a number of long shanked delicately constructed files, and a variety of scraping instruments, all of which were unspeakably dull. Yet, had they been sharp, as the maker intended them to be, the tooth would have been too deeply cut and injured rather than improved, since a long, flexible shank requires pressure in using.

When asked for an opinion I was forced to say, ''Doctor, you have obtained these good results through the imperfect condition of your instruments. Were I to use your instruments they are in just the condition I should wish them to be; their dullness has made it possible to leave smooth surfaces.'' Sharp cutting instruments remove much of the cementum, leaving the tooth in a sensitive state, requiring a lapse of time to correct the injury. This effect rarely occurs where a planing instrument is skillfully used.

While speaking of sensitiveness following the treatment of teeth, I wish to say that the quickest and only permanent remedy for this is mechanically to free the mouth of all fermentation. This is done by a thorough polishing of all exposed tooth surfaces, using wooden points in hand porte-polishers once or twice a week to keep the teeth free from mucous placques.

Pyorrhea is a curable disease in every instance where there is an alveolar process left to support the tooth; and the cure is largely a mechanical operation. The first step in treatment is to remove all deposits of tartar, smooth all roughened tooth surfaces, trim the overhanging margins of fillings, remove badly fitting crowns and everything else that provides lodgment for food upon the tooth surfaces, relieving the mouth from the principal irritations by mechanical means. The removal of deposits allows the gum tissues to settle closely about the roots of a tooth. From this moment, I instruct patients to abandon any effort to clean the teeth and to use every effort in massaging the gums with the brush. This massaging of the gums is the proof of the dentist's work, because if all deposits have not been removed, massaging the gums brings out any point of irritation. When all of the root surfaces are perfectly smooth, massaging the gums causes them to recede to a point where there is bone to support them; and this, in itself, eliminates pyorrhea pockets.

The proof that this treatment is correct rests upon the fact that patients are able to attain immune conditions. Yet this point must be reached by careful stages, lengthening the period between sittings as judgment dictates. In other words, a patient's efforts, in conjunction with my prophylactic work, constitutes a form of treatment which I do not regard as successful until all pockets have been eliminated. Then, the teeth are in so polished a condition that the patient will return at subsequent sittings, showing the teeth free from mucous placques and stains, and with gums of normal firmness. To arrive at this result involves the careful instruction of patients with reference to massaging the gums with the brush. In this particular the dentist's criticisms should be very gentle until quite sure that his part of the work has been thoroughly done.

I wish to say in closing to those who are especially interested in instrumentation in pyorrhea that I will devote my entire time, while here, either in private or public clinics, to demonstrating the practicability of the methods I am teaching.

## DISCUSSION.

**Dr. N. S. Hoff**, Ann Arbor, Mich.: I have written and shall read to you what I want to say on this subject, because I know if I ever start talking about it, I shall keep you here all afternoon, so I will be merciful:

The essayist raises one question in his preliminary statement that he answers so briefly that I fear it may not have the consideration in the discussion that its importance demands. He says in substance, that it seems to him that the subject of instrumentation is not given its proper valuation by other writers, as a means in curing pyorrhea alveolaris; and that he considers a well defined operative technique of the utmost importance in the successful treatment of this disease.

I believe if we make a close study and review the literature for the past ten years, we shall be surprised to know how much had been written on the purely operative side of this subject. I shall not take your time to trace historically this treatment, but briefly I would remind you that Dr. J. M. Riggs, of Hartford, Conn., as early as 1840 began to successfully treat this disease by instrumentation only. At that time he used with great precision a set of scalers of his own designing with which he was able to successfully operate the affected teeth, even to their very root ends. He used no disinfectant remedies, other than tincture of myrrh, which he employed as an anodyne to quiet the pain and promote healing. It is remarkable that he was able to secure such satisfactory results, in view of the fact that his instruments were really crude and ill adapted to the work, and besides he knew nothing of modern aseptic methods. We can only account for his success by attributing to him a remarkable skill in delicate manipulation, backed by a dogged determination, which was supported and encouraged by his faith in the efficacy of thorough instrumentation.

What Riggs did by instrumentation in his day has been repeated by all workers in this field, up to the present time, with more or less of precision and success. I have only to mention the names of a few men who have done their share in emphasizing the surgical treatment of this disease to show that in all times instrumentation has been the main reliance. Dr. Allport, of Chicago; Dr. Mills, of New York; Dr. Peirce, of Philadelphia; Dr. Rehwinkle, of Ohio; Dr. Harlan, of Chicago; Dr. Younger, of San Francisco; Dr. Taylor, of Hartford, Conn.; Dr. D. D. Smith, of Philadelphia, and the host of workers of our present time who are placing their chief dependence on operative treatment, with incidental medication, only to the extent of reestablishing the normal functions in chronically diseased tissues and to prevent possible infection.

I do not make this recital as a criticism of our essayist's statement, but to assure him that he must not get the pessimistic notion that at one time possessed the good man Elijah, who thought he was all alone in the work, and sought a hiding place in the Juniper Forest, where he might die in peace; but the Lord sought him out and made it clear to him that there were more than seven thousand Israelites who had never bowed the knee to Baal. Now I do not wish you to think our essayist has the blues, or that he is so egotistical as to think he alone is advocating the only right treatment for this disease. I have known him personally and intimately for many years, and I know of no more conscientious and enthusiastic devotee of this great work of rescue and preventive dentistry. It is because of the one fact that the dental profession, en-masse, will not see its opportunity to do one of the grandest works for humanity that the world needs today, and do it in a way that he has tested out to his own satisfaction, that causes our essayist to feel that we are not handling this matter in an adequate manner. It is this feeling that brings him here today with his message. Dr. James is not only an honest and capable worker in this field, but he, like the prophet of old, thinks there must be something radically wrong with all practitioners, because we are so blind to the grand opportunity that is open for us to place our profession at the head of all the useful and humane callings in the world. There are dozens of good men that to my certain knowledge are doing this work with great efficiency, and I have no fears myself, as to the eventual outcome. The dental profession today is grappling with a tremendous burden. We are astonished at the facts revealed by the statistics gathered in the great oral hygiene campaign, which has spread with wonderful speed, not alone over this, but every educated and modern nation of the world. There is a greater demand made upon dental practitioners today for the customary repair treatments than ever before in the history of dentistry, and we are simply unable to undertake so important a work as is here under consideration. Some one has made the statement that there are not enough dentists in the United States to take proper care of the teeth needing attention in the great city of New York. We can readily believe that this statement is not much overdrawn. We are not educating enough dentists to supply in anything like a proper manner the actual demands of today, nor tomorrow. If this is true, it is high time that we were beginning to change our methods and see if there is any way of stopping this ever increasing destruction of the most important organs of the body. Dr. James, and others who are working along this line, are becoming convinced that prevention of the two great dental diseases, caries and peridentitis, are wholly practicable and attainable, not by some ''hocus-pocus hoodooism,'' nor by painless and agreeable medication even, but that skillful surgical practice offers the best known treatment for rescuing the teeth from peridental disease, and that faithfully executed prophylaxis treatments will put under control the ravages of dental caries also.

Dr. James knows what can be done, because he has obtained definite results by a definite form of treatment, and he cannot understand why we should not all see the matter as he sees it, and change our ideals and methods to conform with what seems to him the more important field of usefulness. He believes by prophylaxis he can prevent caries, and by a proper surgical treatment he can rescue even teeth desperately affected with peridental disease. And since these are the two great causes for the ever increasing burden on the profession, why should the profession waste time in testing any therapeutic measures that have not yet demonstrated their usefulness, instead of concentrating all its forces on methods that have been proven efficient?

Our essayist presents to us the method of manipulation with a particular form of instrument, and its technical manipulation, and strongly advocates its adoption. We are familiar with this particular form of instrument and its manipulative technique, from considerable technique use, and can cordially endorse all the essayist says in regard to it. We are not, however, ready to say that good results may not be reached with other well adapted and skillfully used instruments. In fact some of the most satisfactory cases we have ever seen were secured by other instruments. We are not prepared to admit that the last word has been said as to instruments, but we are of the opinion that instrumentation of a sufficiently radical kind to effectually remove all extraneous deposits of every sort from all the root surfaces is essential to any permanent cure of peridental affections of any degree, and that instrumentation as a prophylactic measure is equally essential to the most thorough and promising results for the prevention of dental caries.

There are many reasons why this work does not make the apparent progress that its advocates desire, besides those of which we have already spoken. Some dentists are not capable of getting enthusiastic over any form of surgical work; they don't understand pathologic conditions; they don't like to handle them in any surgical manner; they don't want to inflict pain, or they have never cultivated the delicate tactile sense, which is more important in this connection than is involved in almost any other tissue in the body. The work must be visualized generally through the fingers and the proper mental conception of the anatomic relations and the pathologic diversions from the normal are not always clearly understood.

Instruments alone will not accomplish desired results. Riggs got his results in spite of his crude instruments. The case cited by the essayist was the result of faithful and determined effort in spite of the dull instruments. An enthusiast can do things with crude implements which reasonable skilled operators may not get with admirably adapted instruments. The imminent Dr. Wm. H. Atkinson once said that he believes he could put in a good gold filling with a ten penny nail. But he didn't handicap his efforts with such crude instruments, and neither should we, in this day, when it is possible to secure anything that we may desire of this character. It behooves us to provide ourselves with such instruments as shall enable us to transform the perverted conditions that come to us into ideal healthful and usable organs, and these instruments must be always sharp and ready for efficient service.

I am personally grateful to Dr. James for his faithfulness to this cause; and thank him sincerely for having the courage to present the technical demands of this work so positively and satisfactorily. I trust we may have an opportunity to see him put his ideals into practical effect in the clinic.

Dr. J. F. Stephan, Cleveland: I am sorry that I cannot entertain the same things that the last speaker gave us in his discussion in regard to the results, as we, as a profession, are obtaining through the instrumentation of the general practitioner.

I don't understand why I should be called upon to discuss this subject, as I am a general practitioner. The instrumentation in pyorrhea treatment has made great advancement, but I have found that it has been painfully neglected, even in the hands of so many specialists, by disregarding the instruments to use.

I think Dr. James is to be commended in bringing a system to us whereby he is able to obtain the results that are not obtained by the vast majority of our profession. Too often the specialist is inclined not to be as thorough and as necessary in getting results as he should get. I know there is a strong indictment in our ideals to make such a statement, and I think that the ideals that Dr. James has held for himself are these that have made it possible for him to revise those—I happen to know that this set of instruments has been so well defined that he has been able to revise these instruments and also this method, which has been giving him such splendid results. I have seen the work and I speak from experience.

I think that instrumentation, as he says, is not a matter of minor importance in dentistry. It is of exceeding importance, and unless a man will put himself to the test in the way that Dr. James did, he will not succeed. Think of the work that Dr. Black has been doing with such wonderful results—then we must consider that this subject is one of constitutional origin. If it is true that disease may be prevented by prophylaxis, then oral hygiene is its keynote, and we, as dentists, during all these lives of ours would practice oral hygiene, and take the patients, after the cleansing of the teeth, we should teach them how necessary it is of the polishing and the care of these organs, after we put them in shape. How well, in the first place, do we put them in shape? Do we remove the membrane? How delicately do we handle these instruments? It seems to me that there is no question that the care of these things is entirely a question of surgical treatment, instrumentation, in other words.

I wish to commend Dr. James for the explicit refinement of his system, both as he has given it to us on the platform and as he shows in his clinic. It shows the character of the man. I wish also to draw attention to that characteristic in which he says not to criticise the patient because he comes back to us with the teeth in a poor condition, but to be sure first that we have done our duty in giving him all that he should have and all that the case requires. I know he has a system that is complete, and whether other instruments can accomplish it or not, it is certainly the man behind the instrument. I don't think that Dr. James thinks that he is the only man in the world doing this kind of work but I do know that he has a system and instruments of his own and he is getting the results.

Dr. Gillette Hayden, Columbus: Dr. James' courtesy in presenting this paper before us is indeed appreciated.

The difficulty of preparing a written explanation of a treatment which depends so essentially upon manual dexterity in manipulating instruments, as well as upon the mental efficiency of the individual, is realized most keenly by those who attempt such an explanation of the instrumentation in pyorrhea alveolaris. So we are exceptionally fortunate in being favored also with a clinic by the essayist.

Dr. James' paper offers not so much an opportunity for discussion as for emphasis and elaboration.

The lack of a system for instrumentation is the great handicap to the dentist, who, with no previous training, attempts the treatment of pyorrhea. Unless that dentist be a determined enthusiast the chances are minute for his ultimate mastery of details and the consequent development of a system of instrumentation of his own.

The treatment of pyorrhea is not destined to become a universal accomplishment among dentists, even with the most satisfactory of methods of instrumentation, for, as your essayist states, "there is no part of dentistry which requires greater skill and technique, or one where the personal adaptability of the operator has more to do with obtaining successful results." If the eyes of each individual dentist can only be trained to see deflections from the normal in the human mouth, and each individual brain made to recognize their import, the first requisite for a definite system of treatment will be accomplished.

Another thing your essayist has tried to bring home to every mind is the realization of the fact that "chemical" and "mechanical" are not synonymous terms. In other words, do not expect antiseptics and tooth pastes to take the place of the instruments.

There have been almost as many methods of operative procedure as there were operators, until the comparatively recent advent of a set of instruments with the possession of which the dentist found it necessary also to acquire the special methods of manipulation.

Here we have a new set of instruments and a new method of manipulation, both of which command attention. To so systematize instrumentation in the treatment of pyorrhea alveolaris, as Dr. James has done, means to increase efficiency and to decrease expenditure of energy and time, and to lessen pain.

In the oral prophylaxis treatment as outlined by Dr. D. D. Smith, we have a definite method of procedure for the prevention of pathological conditions of the mouth, and when we have for the treatment of pyorrhea a systematized method of instrumentation which will depend less completely upon the individual skill of the operator and more upon the mechanical application of a method, we will have arrived at a much better goal—even then—''the tools belong to him who can use them,'' and let us add *only to him*.

DR. FRANK W. SAGE, Cincinnati: If none of the notables want to talk on this subject, I wish to say a few words.

The treatment of pyorrhea, I think, does not receive the attention it deserves, from many dentists, for several reasons. The main one is, that it does not always pay. This is purely a selfish consideration, and I believe it is often a deterrent to many dentists. Dentists get paid for plates, for bridges, for fillings, and patients do not object to that. But at the last moment the patient is liable to say, ''Will you see if my teeth need cleaning?'' and the dentist, being one of a numerous class who hate to clean teeth, gives them a hasty brushing, and dismisses the patient.

It would seem that the dentist fears the patient may receive as an unwelcome bit of information, the statement that further expense must be incurred for treatment of a case of pyorrhea. No doubt this privately conceived conviction has something to do with the dentist's lack of interest.

The cases of this disease—the phase that perplexes me—is that in which the teeth appear loose, yet the attachment of the gum at the gingival border seems unimpaired. I have never known just what to do with those cases. We are told not to injure the gingival attachments; then we have this to reconcile with another admonition to go up freely under the cervical attachment, and plane or otherwise remove all concretions on the roots.

I suspect I do not know how to treat this disease. I have, indeed, no objection to stating that I have referred such cases as seemed to me hopeless, to specialists in our city. I am bound to state they seem not to cure them, either. They do stop purulent discharges, but the teeth remain loose.

Dr. N. S. Hoff has discussed very ably this subject. I regard his monograph on alveolitis (the new name for pyorrhea) as the most exhaustive exposition of the subject in all its phases I have yet seen. He is very explicit as to both symptoms and remedies, and from a clinical standpoint there would seem to be nothing further to say on the subject.

I want to say that from personal experience recently, of this disease, I have become convinced that ofttimes we dentists fail to appreciate the comfort afforded patients by palliative treatment even in cases of teeth already past all surgery. A loose tooth, seemingly doomed at once to the forceps, is made much more comfortable than the dentist might suppose, by a simple scraping or planing of the roots and an anodyne application. So if your patient insists on postponing extraction you recommend, and wants you to apply lactic acid, tincture of calendula—what-not, by all means do so?

I say then, that until I came myself to experience the relief afforded by such palliative treatment of my own teeth, I had no idea how well worth while such treatment really was.

The question has been asked, do we ever really cure these advanced cases? In my office I am sandwiched in between two medical specialists. I recently asked one, ''Doctor, do you cure catarrh?'' To which he replied that catarrh is not a disease, but a condition, and that he cured the condition. That seemed to me merely a subterfuge. But the late Dr. Heise, of this city (Cincinnati), used to say substantially the same thing. He said he could cure pyorrhea, and if it returned in a few months, he claimed to be able to cure it again.

It was my privilege to graduate in the class that gave to the profession several men of note: Dr. J. E. Cravens, of Indianapolis, and Dr. John Stephan, of Cleveland, among others. Dr. Cravens, a few years ago, gave out that he could cure pyorrhea, and indeed he did cure cases, using nitrate of silver, I believe, as the chief medicament. But one of his patients, who went from this city to him, reported he had been cured, yet admitted that the teeth so cured had to be extracted, being loose and useless, although free from discharge and pain.

My own private feeling is, that in the treatment of pyorrhea we are liable to run up against the same difficulties we had years ago, in capping pulps. Some thirty-five years ago it was regarded as hardly less than criminal to destroy and remove a pulp, and that, too, almost regardless of conditions. It is amazing, nothing less than astounding, to recall how dentists allowed their better judgment and common sense to be dominated by this absurd craze. What was proposed was, in brief, to cover over with suitable capping any and (almost) every pulp, hoping to save it alive.

It is almost inconceivable that the profession, with some fair degree of knowledge of pathological conditions pertaining to exposed pulps, could have so long blindly followed such a fad. Today I, for one, go rather to the extreme of devitalizing, believing that the best thing for my patient; that is, after a pulp has once ached. After a similar fashion I remove teeth hopelessly loose.

Now, finally, as to pyorrhea (I am told I should call it alveolitis, but let that go). The real requirement, doubtless, in treating this disease, is thorough excavating of the involved apical region. Dig out all infected bone-tissue. Get beyond the zone of infection, or all efforts will inevitably fail.

I hope that in all the foregoing I have not created the impression that I have little faith in surgical treatment of this disease. On the contrary I pin my hope of a cure on radical surgical interference, early. The trouble is, we do not get at these cases early enough. Perhaps two months after we have put a patient's mouth in order, there being no indication of this trouble impending, that patient presents with an acute, desperately bad case of pyorrhea. That is the discouraging feature of this disease—its insidious, rapid, unheralded approach. These are the cases we must cure, or show ourselves crimininally negligent.

Dr. A. F. James, (closing): The general practice of dentistry has always been a very discouraging proposition to me, because of the recurrence of decay around fillings, and gum irritations, that are almost always present where extensive dental work has been done.

My college teacher, Dr. David Cattell, impressed me with the thought that it was the dentist's business to *save* teeth. I experienced many failures, and this led me to take up the work of preventive dentistry.

In reference to the doctor's remarks about recurrence of pyorrhea, I wish to say pyorrhea will recur if the cause of local irritation is not removed, the mouth is not kept clean and free from a general state of fermentation. This can be done by intelligent prophylactic methods.

Drs. Hoff and Hayden have been kind in their treatment of my paper, but when Dr. Hoff says that many are doing this work successfully, I wish to remind him that there are many more who are not, and among them dental instructors.

Only a month ago the dean of one of our prominent dental colleges made the statement in open discussion—pyorrhea cannot be cured, and that all pyorrhea teeth should be extracted.

Now I know that pyorrhea can be cured in any case where there is bone left to support the tooth, and the cure can be maintained with no more care from the dentist than is required to keep the teeth reasonably free from decay, and in all mouths pyorrhea can be prevented.

The mistake the dentist makes in preventive work is neglecting to instruct the patient in the proper care of the teeth and gums.

# VACCINE THERAPY IN PYORRHOEA ALVEOLARIS

BY F. L. ARMITAGE, AUCKLAND, N. Z.

**Bacteriologist in the Clinical Laboratory**

THE FIRST STEP to vaccine treatment is, of course, the determination of the infecting organisms and their isolation. It is, however, an absurd waste of time to make any effort in this direction until the pockets have been thoroughly cleaned out, and the more superficial bacteria destroyed by painting the gums and teeth with iodine, drying and washing with sterilized Wright's saline citrate solution (5% NaCl, 0.5% citrate of soda in water), or other effectual treatment. After allowing some time, say twenty minutes, longer if necessary, to elapse, some of the pus or secretion may be withdrawn from the bottom of several of the pockets by means of sterilized capillary pipettes, and scrapings taken from the tissues lining the pockets. From these various specimens smears are made, stained by Gram's method and examined; this examination serves as a control to the cultural findings and as a guide to the culture media most suitable to the various organisms that may be present.

The culture from the specimen of pus and scrapings should be made on blood agar plates; these plates are prepared by mixing 1 to 2 c.c. of fresh blood, taken from a vein by means of a hypodermic syringe with aseptic precautions, with 5 or 6 c.c. of nutrient agar, which has been melted and cooled to about 40 or 40°C. After the blood agar has become firm, the swab carrying the pus should be stroked in successive lines across the surface of the medium; similar strokes may be made on another blood agar plate with the short end of a glass rod bent at right angles, which has been rubbed with the infected swab. By this means some part of the plate will have colonies sufficiently far from one another to enable examinations and sub-cultures to be made of the different kinds of organisms. A pure culture will be obtained only in the very earliest stages of the disease.

This examination, controlled by the findings of the smears, will enable the chief infecting organisms to be determined and isolated; sometimes difficulty of isolation entails what I may term a dilution method: the organism predominating in numbers in the smears may not appear at all on the plates, or in so few numbers as to make it impossible of isolation; either due to feebleness of growth or inhibition by the other organisms; in such a case the pus is introduced into a broth tube, shaken well, a few loopfuls introduced into another broth tube, shaken well, and this repeated in several tubes; these broth cultures are then incubated, and in the tube in which the dilution is sufficiently great to ensure the presence of the predominating organism, but to avoid the others, the desired culture may be obtained.

I have also found it necessary to use special media, for instance, if difficulty be found in isolating a streptococcus, because of the more rapid growth of an accompanying staphylococcus, the staphylococcuus is incubated in broth for several days, the broth then sterilized and used to make some tubes of glycerine or blood agar; this "staphylococcal agar" used as slopes or plates will inhibit the staphylococcus, but not the streptococcus, and no difficulty is found in growing and isolating the streptococcus.

Cultures made direct with the pus on agar slopes will not by any means give an accurate diagnosis if a mixed infection be present, and in the many cases of pyorrhoea I have examined a mixed infection is the rule. Stahpylococci torulae, coliform organisms completely outgrow the more delicate streptococcus, pneumococcus, micrococcus, catarrhalis, or B. fusiformis and the chance of growing B. influenzae on agar slopes from such pus would be nil. Then again the organism described as a strepto-bacillus by Goadby requires special care for isolation; see "Lancet," March 11, 1911.

It is advisable to use a pure culture obtained with as little subculturing as possible; as the virulence of the organism diminishes by subculturing, so apparently does the therapeutic value of the resultant vaccine depreciate.

The pure cultures being obtained, the water of condensation at the bottom of the tube, or if there be none, a few drops of 1% sodium chloride solution containing 0.5% carbolic acid, is used to emulsify the growth with a sterile aluminum rod or capillary pipette sealed at the end. The mouth of the tube being flamed, the emulsion is then poured into a sterile 20c.c. Ehrlenmeyer flask, containing a few sterile beads. The culture tube is then washed out with a few c.c. of the saline and carbolic acid solution, and these washings added to the flask. Agitation of contents of the flask soon breaks up the clumps, shaking in a test tube without beads would never do so and centrifuging would simply drive clumps to the bottom of the centrifuge tube.

If micrococcus catarrhalis or certain diphtheroids be present, great difficulty may be found in breaking up the clumps owing to spontaneous agglutination; this may sometimes be overcome by immersing the flask and contents in water at 60°, 70°, or even 80° C. for a few minutes.

The emulsion is then poured into a centrifuge tube and the flask and beads washed with a few c.c. of the saline and carbolic solution and the washings added to the emulsion. The tube is then centrifuged to drive debris and clumps to the bottom and the supernatant fluid pipetted off into a sterile graduated 10 c.c. measure, which is then plugged with sterile cotton wool.

If doses over 2,000 millions are to be put up I use 1% sodium chloride solution, containing 1% carbolic acid to make my emulsion, but I use the 0.5% carbolic for all subsequent dilutions.

The next process is the standardization. A sterile capillary pipette fitted with a rubber teat is then marked with blue grease pencil about an inch from the end. A finger is then cleaned and pricked with a sterile needle between the nail and the first joint and the blood allowed to ooze out without any squeezing. A volume of blood is then drawn into the pipette as far as the blue mark; a bubble of air allowed to follow, and then a volume of the emulsion taken, so that equal volumes of blood and emulsion are in the pipette. Of course, care has to be taken that the emulsion is well mixed at the time the sample is drawn off. (Should the blood be one which clots quickly a volume of 2% citrate of soda may be drawn into the pipette before the blood). These are then very thoroughly mixed by expressing on to a clean slide and repeatedly drawing up into the pipette and expelling. The mixture is then transferred to two slides clean and perfectly free from grease, half to each slide, the drops being placed near the end of the slides. With the edge of another clean slide the drops are then spread in a thin even film over the length of the slides. After drying in the air, but protected from dust, these slides are stained with Leishmann's stain, washed and dried without heat.

The object now being to obtain a ratio between the number of red corpuscles and the bacteria, it is necessary to count them by the help of crossed wires, and the red cells and the bacteria in at least 20 "fields" should be counted in different parts of the slide. The result may be checked by counting the second slide. Blood containing five million red cells per c.m.m. it is a matter of simple proportion to estimate the strength of the emulsion by the ratio between the red cells and the bacteria, as equal volumes were used. The counting may also be done with the Haemocytometer, but I find the above method just as accurate, and it entails less cleaning. The strength of the emulsion being thus obtained, it is thoroughly mixed with a pipette and some drawn off and sealed in a test tube sterilized and labeled for possible future requirements. I keep sterile test tubes drawn out in the middle and plugged ready for use when required. Sufficient of the vaccine for present use having been left in the measuring tube this can now be diluted with the saline and carbolic solution so that 1 c.c. contains the maximum dose likely to be required. If heat is to be used for sterilization it is then placed in a beaker of water at the required temperature, which varies with different organisms from 54° to 60° C., quickly put into the water oven regulated to the same temperature and the thermometer lowered into the water in the beaker so that the temperature can be read from the outside, and so make it unnecessary to open the door of the oven. After sterilizing for an hour it is ready for dosing. This may be done by means of a small graduated burette fitted with a needle from a small serum syringe, the whole having been sterilized. But when only a few doses have to be put up it is quicker and more convenient to draw off each dose from the graduated 10 c.c. measure with a sterile capillary pipette, which is also used to thoroughly mix the vaccine after each dilution. If the burette is used the whole of the vaccine has to be run out every time a dilution has to be made, and then returned to the burette, which not only takes time, but is more likely to lead to contamination than the other method. Two or three doses of 1 c.c. are drawn off and introduced into sterile glass ampules. I use ampules of different colored glass for different strengths to avoid any chance of mixing the doses, always keeping to the same colors for the same doses. The vaccine in the measuring glass is then diluted with the saline and carbolic so that it contains, say, half the number of organisms per c.c. and two or three doses of 1 c.c. drawn off as before. By repeatedly diluting and drawing off, a range of doses can quickly be put up varying from, say, 2,000 to 100 in the case of a staphylococcus or 500 to 10 in the case of a streptococcus. The ampules are then sealed in the flame of a Bunsen burner and are ready for further sterilization by heat if required.

Some organisms, such as staphylococcus aureus, require to be sterilized by heat; others, such as those of the typhoid and coli group, are better not heated, the carbolic effecting sterilization perfectly, while heat causes great deterioration in the efficacy and keeping qualities. In the case of some organisms, such as the pneumococcus, for some reason unknown to me, heat is sometimes necessary, but at others a heated vaccine is useless and sterilization by the carbolic acid has to be relied upon. Temperatures over 60° C. are disastrous, and I find sterilization on two successive days at 54° to 55° C. for an hour to be quite safe and effectual for most organisms.

The vaccine should be tested by planting a few loopfuls on agar or blood serum and incubating for two or three days. My vaccines are all so tested and although I have now made over a thousand, no case of growth has been obtained, but when heat has not been used and I have depended on the carbolic acid, three days are always allowed for the sterilization to take effect before the test is made.

After sterilizing the vaccine is packed in boxes, each box containing three or four different strengths and the boxes labeled; these boxes are enclosed in a larger box which is labeled with the patient's name, the nature of the vaccine, the date, and with ruled spaces for the vaccinator to fill in with the dose and the date given, so that the box acts as a record of the injections and checks the case book.

Should it be found that doses of any particular strength suit the patient, they can be put up at any time from the stock in the sealed tube. Certain vaccines, such as those made of coliform organisms, are often not worth keeping more than three months if the patient has been under treatment during the time, as experience shows that in some cases they lose their effect on the patient, not because they deteriorate, but because the patient becomes insusceptible to the vaccine, or because the infection has adapted itself to the change of environment, probably the latter. In such cases a fresh vaccine has to be prepared.

When a vaccine has to be prepared of more than one organism, the vaccines are mixed for dosage, but the stocks kept separate, as one infecting organism may die out but another persist or even another organism replace one of the originals. The superfluous vaccine can then be omitted if required, or the size of dose of one increased and the others maintained or decreased.

As regards site of injection, care must be taken to avoid the extremities, such as the fore arm, or the leg, or oedema may follow; the best sites for injection are, the loose skin on the left side of the abdomen, the buttock or the upper part of the chest, just below the center of the clavicle. I prefer the abdomen. The skin is best prepared by washing with dilute Lysol, or painting with tincture of iodine. The hypodermic syringe should be sterilized by boiling in water for 15 minutes, the needle, if steel, in absolute alcohol, as it will not then rust or lose its sharpness. Intervals between doses of course vary with different patients from 5 to 10 days.

The commonest infecting organisms and the dosages of vaccine in pyorrhea alveolaris are as follows:

| | *Initial Dose* | *Maximum Dose* |
|---|---|---|
| Streptococcus | 25 Million | 500 Million |
| Staphylococcus | 100 " | 2000 " |
| Pneumococcus | 25 " | 500 " |
| M. Catarrhalis | 100 " | 500 " |

Don't use vaccine treatment unless prepared to spend time and trouble to carry it out efficiently.

Don't neglect to have periodical examinations of the pus during treatment.

Don't expect a cured or arrested case to maintain its condition; watch it carefully from time to time, and use prophylactic treatment.

Don't give up hope if a patient, after responding to a vaccine, fails to show any response; give a few weeks' rest, start again with a small dose and use longer intervals.

And lastly, don't expect either to attain or maintain a cure or improvement without adequate local treatment; vaccines cannot replace surgery; they are, however, a most useful adjunct.

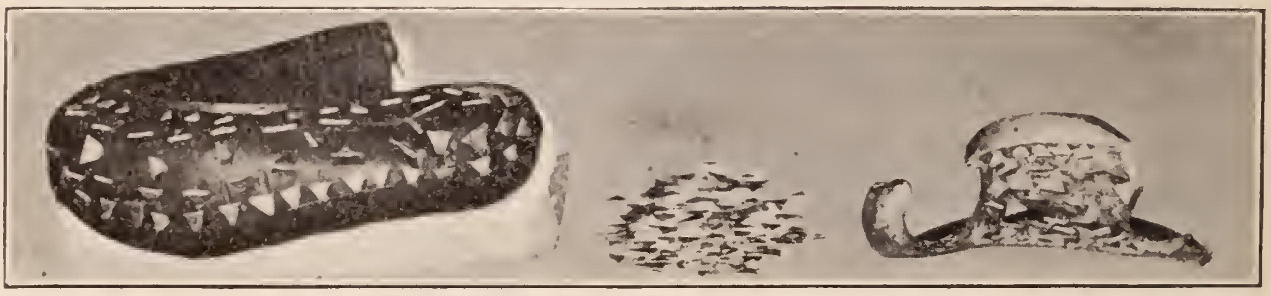
I have avoided giving expression to any opinion as to the results of treatment for two reasons: Firstly, because I do not consider that I can record enough cases to justify such opinion; and secondly, because I think it is the province of the dental surgeon to do so, as he is in a position to know exactly what change has taken place and how long and to what extent improvement is maintained, knowledge which is often unavailable to the laboratory worker.

# NEW VULCANITE ANCHORAGE FOR METAL PLATES

BY W. R. COLLIER, D.D.S., AUSTIN, TEXAS

I HAVE found the small wax lugs commonly used rather difficult to place properly, requiring considerable time even for a skillful laboratory man. In some places they are very hard to use, and not easily attached anywhere. Unless put on by means of heated wax they are liable to become detached and lost in the investment. I have myself lost them, and think others must have had similar experience.

My method is to substitute for the wax lugs others made of the same metal of which the plate is to be cast. These metal lugs are very easily handled, may be set at any point or angle in the wax model, as shown in cut, and form a perfect anchorage for the vulcanite. In some cases the use of these three-cornered flat metal lugs renders the making of undercuts in the rim of model less necessary, a decided advantage in casting plates that must be thin at that point.



In order to illustrate the method I have used more lugs in my model than necessary in a practical case. Any of them that should be found unnecessary or in the way in setting a tooth may be bent out of the way, or twisted off with pliers.

The illustration shows a waxed-up model, with metal points in place, a small partial plate, and some of the detached metal points. These points I have made myself, clipping them from a sheet of plate metal. If enough casting men are interested in my method to make it worth while, the depots will no doubt be willing to carry and supply the points in quantities.

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The editorship of the *Pacific Dental Gazette*, San Francisco, has been offered to and accepted by Dr. Julio Endelman, of Ashland, Oregon. He will continue to reside in Ashland. While a resident of Philadelphia, Dr. Endelman gained journalistic experience as assistant editor of the *Dental Cosmos*.

# CROWN AND REMOVABLE BRIDGE WORK.*

BY DR. P. A. GOULD, GIBSONBURG, OHIO

IT IS TOO much to think of going into the discussion in detail of every theory and part of the work in one paper or essay; in fact, this would require a fair size book, and as we can perceive things faster than we can understand them we will make our talk short as possible, and then illustrate by things to be seen, which will be better understood when put into practice. We will introduce the subject in the following order:

*1st.* Where removable bridge work could be best recommended.

*2d.* What are its advantages?

*3d.* What are to be considered as the most important points in its construction?

*4th.* The principal causes for its failures.

*5th.* What are the advantages over plate work?

*6th.* How does it compare with solid gold bridge-work, or that with solid attachments?

*7th.* What benefit is it to the patient, practitioner and the profession?

*8th.* The operative and prosthetic work.

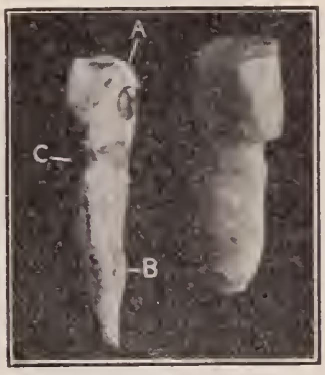

Fig. 1.

## WHERE REMOVABLE BRIDGE-WORK COULD BE BEST RECOMMENDED

It can be recommended in more cases than any other and supply the desired prosthesis. Much service may be derived from two teeth; in fact, should they be in the proper position in relation to each other, a whole denture may be supplied by the use of them, and give more service than a similar full denture of solid bridge-work, should there be added the extra solid teeth necessary for abutments.

The bicuspids are in position to be most effective for use on either maxilla, especially the inferior, for a full or partial denture. On the superior maxilla bicuspids and second and third molars for the posterior and the bicuspids and cuspids for the anterior teeth. The cuspids and incisors may be all bridged in from the first bicuspids, and it will not be necessary to interfere with posterior teeth.

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*Read before the Sandusky County Dental Society, 1912.

We find many cases for the work, but to mention an important class, many patients of advanced years who have probably the cuspids and two or three bicuspids on the inferior maxilla and an upper plate, or possibly conditions that would indicate one.

Here we have an important case; should your fee be very large, provided you do your work properly, you may depend upon it that the patient would not part with the work you have done for anything, especially if any other kind of partial denture has been tried.

We can put in this kind of bridge-work for any case that would indicate a place for a bridge, and experience has shown that they give the best satisfaction. But before recommending any bridge-work, one most important thing to be considered is the predisposition to pyorrhea.

This will be referred to in what follows, by showing some ways to prevent it, and also how easy it is to establish it; at least, we will draw attention to some very important facts.

Suffice to say that a patient that is subject to pyorrhea in most cases is a fit subject to derive benefit from removable bridge-work, if the case is given the treatment that it needs, and the work is properly inserted.

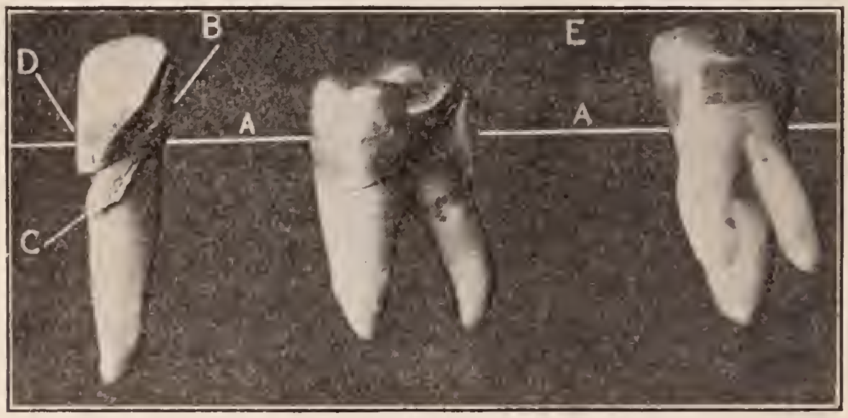

Fig. 2.

As before stated, an opportunity for this kind of work occurs with those of advanced age, and it might here be said that if one out of every ten of the people that had indications for this kind of work had means to have it done, and 10 per cent. of those had it done, it would keep every practitioner with a very small practice busy to fill in his share of the work that would come for him to do.

### WHAT ARE ITS ADVANTAGES?

When we advance a new theory in the way of improvements in the construction of any utility in dental work, we generally advance our theory by a comparison with what has been used, and correct or show defects. To do this we will first observe the principal defects in solid gold bridge-work, and in the concluding division of this clinic, that of the operative and mechanical work, show the corrections.

Not attempting at this time to furnish any statistics, as they only arrive at, and are evidences of proof, of that with which an experienced practitioner is always familiar, we will not fill up space and time with them. To speak of all the evils to be eradicated in the old form of bridge-work, there are too many; we will speak of a few and with what we have to show you the others will suggest themselves, without enumerating them here, to say nothing of the vast amount of evil effects that come from this kind of dental work.

It is a question that suggests itself to us in the many cases that are brought to our notice, whether or not it is a means of revenue only to a dental practice, and something that ought not command the respect of the public who have to pay and then suffer for the work that is done.

This last part may be all right if those who pay for it are ignorant of what they suffer; our experience has taught us that all are not ignorant, and why should we profess ignorance with this experience and keep on hammering at the same old job work?

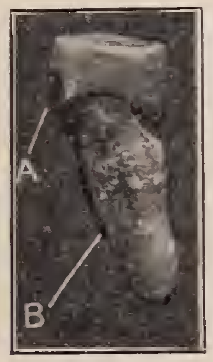

Fig. 3.

Fig. 4.

Fig. 5.

It is not necessary to diagnose all the physical symptoms of disease that are caused or stimulated by the infection of an imperfectly fitted gold crown in the mouth. The general physical effects of a posterior bridge, so constructed that there is the smallest point that cannot be cleaned, need not here be commented upon when we place so much stress upon the necessity of prophylaxis in patients' use of the tooth brush.

I might say here that the one who recommends the use of stationary solid saddle bridges, and makes and puts them into his patients' mouths, is a fit subject to be referred to a committee on dental jurisprudence.

One gold crown improperly made and put on a tooth is enough, in some cases, to cause discomfiture to the whole physical anatomy, from the irritation caused by the way the operation was done and the irritation that may come from the crown itself. But gold crown work can be done properly and when so done will always be a credit to the one who did it and to the profession. This part of the discussion will be referred to later in the preparation of the teeth and the construction of gold crowns.

The principal advantages of removable bridge-work are the wide range of its application; the possibility of restoring teeth affected with pyorrhea and pericementitis; also it is the best way to come the nearest to restoring the normal masticating surface, and we must not lose sight of this last and most important advantage mentioned.

### WHAT ARE TO BE CONSIDERED AS THE MOST IMPORTANT FEATURES IN ITS CONSTRUCTION?

First thing is the proper diagnosis of the case. Are there any indications of exostosis, pericementitis, or pyorrhea alveolaris? Of the first if we find it already indicated, not much good can be done by crowning a tooth affected with exostosis, and if we do not find it a couple of teeth here shown will illustrate how easy it is to establish this trouble, if not always on the tooth crowned, we may do so on some other tooth by not paying attention to the effect of the occlusion when the crown is put in.

The effects of malocclusion in establishing a case of exostosis the two teeth here shown will illustrate. (See Fig. 1). One the cuspid was affected by extracting occluding teeth so that the force of the bite came at only one point of contact for a short space on the lingual surface of the distal angle marked A; a cavity is also found here. Note the accumulation of tartar at C, corresponding identically with the exostosis on the root of the tooth at B.

Another tooth we have here is an inferior-left bicuspid crowned so that it had a bad case of malocclusion. In both of these cases the pressure of the bite was not brought to bear in a natural way into the socket of the alveolus for the respective teeth.

The consequences may be studied as to what nature will do when these conditions are established in the dentures of patients who are past the age of 35 or 40 years.

As to pericementitis and pyorrhea, we very often find the causes that produce them can be removed by establishing a normal articulation and use of the tooth by attachments that hold it in its normal position, cause no irritation, and bring no strain that will tend to cause an unnatural pressure in any manner in the alveolus.

We will be surprised often to note how much use can be derived from some short root of a cuspid or a bicuspid or a molar when we re-establish the conditions that have been made abnormal by the extracting of some teeth, and the removing of all causes of irritation.

The establishment of a perfect occlusion has to be dealt with as one of the most important features in the construction of any case in dental work; in establishing a normal occlusion not only to the teeth incorporated in the work; but also the effect upon other teeth in the mouth must be considered. Teeth are like men; when they are performing a use in a way that is natural to them, their powers for good are realized until death.

### WHAT ARE THE PRINCIPAL CAUSES OF FAILURES?

They are two, or they can come under the head of two classes: uncleanliness and irritation. In speaking of the first we find patients where the work is practical for all reasons but this.

It is surprising how, when we find an opportunity for removable bridge-work, we cannot get the patients to keep the mouth clean. We find some who do not seem to know or understand what we call clean; people who never used a tooth brush properly, or may be not at all, and handle one as gracefully as an ordinary blacksmith would handle the square and compass of a designer. It becomes the part of the professional man to look well to and study the character of the work he has at hand in all its particulars. The work we have to set before you will certainly fail if your patient does not keep it cleaner than many do the plate work we often find. We all know what to expect from a patient who will take a plate from the mouth for repair work, wipe it off with a dirty handkerchief the best he can; we have them once in a while, and the dentist often has to do a lot of scraping and polishing before he can find the plate proper.

Irritation follows all uncleanliness: the sepsis which follows affects the general health; and the dentist must put it down as a mistake on his part if he puts in a piece of removable bridge-work that will not be kept clean; it will be sure to prove a failure.

Irritation has already been referred to under the head "What Is Most Important in Construction." The irritation from malocclusion and at the gingival line will cause trouble that will prove very disastrous to any crown or bridge-work, even where we have prophylaxis thoroughly established. We must avoid all clasp or spring attachments that will in any way take the form of an orthodontia appliance: though it may not exactly move the teeth, it can do as much as to establish an irritation; and we are apt some day to find a bad case of pyorrhea, or pericementitis; and then, with great wisdom, refer the trouble to some systemic condition, while the cause is purely local. The character of swinging bridges will come under this class of causes for irritation: be very careful not to establish any leverage or swing motion to tip or rotate a tooth in its socket, as by doing that, which is unnatural, we will be apt to establish one if not all of the three conditions mentioned—pyorrhea, pericementitis, or exostosis.

The normal conditions must always be established as far as possible: this theory will be referred to again in the subject of operative and prosthetic work.

One of the most common causes of failure in crown work, taking for granted that the pulp chamber and root canals are sterilized and filled properly, occurs from one of the three troubles already given, and in not having properly dressed or ground the tooth for a crown: if this is not done right you will never get a crown to fit the tooth in a manner that if it were extracted it would look like a natural tooth with a gold crown.

A crown for bridge-work should fit tight at the first point of contact to correspond with the cervical line: the outer surface line of the crown should be continuous from this point of contact, and the tooth so ground as to allow the crown to slip over to it without changing its shape, and can be so made that it is impossible to push it further. This can all be done without irritating gums too much; it is when we go beyond this line in our cutting and fitting that we cause irritation and pain. We will illustrate this with some teeth that have differently fitting crowns, some very imperfect. (Fig. 2).

We have here a superior right lateral: the enamel and cervical line can be seen extending at all points beyond the crown, the mesio-cervical and labial-cervical line being the only points where the gold is adapted to the tooth. (See B). Here the crown offers the least irritation, and we find the tartar nearest to the gold. Where the irritation is the greatest the gold is not adapted to the tooth, and the tartar at C extends as much as one-quarter of an inch beyond the gold; a small cavity has made its appearance above at this point. Here is another crown that fits at the cervical line, but observe the chance there is to push the crown beyond this line marked A. (See E). A third crown will show one properly fitted, the construction of which will be explained under that subject; irritation should be considered as much or more than anything else, as most important to be careful about in making a crown, especially when the same is to be used for attachments of bridge-work.

Here is a crown tooth that failed for me as one of my first attempts at removable bridge-work (Fig. 3); the tartar has been scraped off; before extracting, the only attachment in the socket this tooth had was at a point below where the gold crown had the best adaptation at the cervical line; see A and B.

We also have another example of irritation to offer in the way of bridge attachments working together. Care should be taken that the top crown on the bridge does not come in contact with the gum; the proper construction of these crowns will be considered under that subject.

In the case of bridge-work here presented, the first bicuspid was crowned next to the one extracted; the one on the right side was badly affected with pericementitis and very loose; the crown was removed, the tooth treated for a couple of weeks, and somewhat restored to a healthy condition; it was recrowned and with the new attachment on the other side is doing good service and making no trouble.

The causes of failure should always be considered before we do work rather than afterwards; and, do the work the best we can, we will have enough failures; the quality of the work that a man does plays in the long run a great part in his success.

### WHAT ARE THE ADVANTAGES OVER PLATE WORK?

This subject is taken into consideration to draw attention to a very important advantage in contrast with plate work. The esthetic effect that can be produced in plate work at times is made use of to a greater advantage than any other work in dentistry. In bridge-work all that has been destroyed by the loss of the teeth is restored without being obliged to use any more material than is necessary to supply this loss, while in point of service, plate work has no comparison with removable bridge-work. A couple of pictures here (Figures 4 and 5) illustrate a very interesting case of the effect of an upper and lower bridge, which produced the remarkable change noted in these two pictures, taken about six weeks apart: this is only one of many cases that might be shown. The work will produce this esthetic effect with much less vulcanite than plate work and should be of the very best quality that can be obtained.

### HOW DOES IT COMPARE WITH SOLID GOLD BRIDGE-WORK?

In comparing and speaking of the advantage gained over partial plate work, the only thing mentioned was that of restoring the features and re-establishing that which is lost by extraction. As it is an improvement in comparison with plate work, it is a much greater one in this respect in comparison with gold bridge-work.

Fig. 6.

The next very important difference, and we take for granted that both are perfect as far as the construction is concerned, is that, in a bridge that is given a solid attachment to the natural teeth, so as to make them take the form of piers, the strain on these teeth used as piers is abnormal. It also becomes a complicated matter at times to adjust the occlusion of all the teeth that come in contact, so as to bring the proper pressure to bear upon the teeth used as piers in their sockets, with twice the number of occluding teeth as is natural for them.

If we practice always to be particular in this regard about the occlusion of every gold bridge we make, many would be of much more service than they are, and some absolute failures would be prevented. When we place the removable bridge in the mouth and it is made properly, the piers always serve to hold the bridge in place in a way that they take no strain that does not come natural to them, the force of the bite on the teeth bridged in is distributed along the alveolar ridge by means of a saddle, which is held in position by the teeth bridged to, and the force of the bite on the teeth used as piers should be natural. Teeth that have given out and become loose under the strain of gold bridge-work, have been restored to a healthy condition and become of much service for removable bridge-work, by adjusting the bite on the ridge where it is proper for it at all points; the natural teeth become solid.

The model (Fig. 6) shows a case of this kind as it looked with the teeth crowned for removable bridge: this was made about two and a half years ago, and the teeth, if anything, showed improvement by use during this time. The man who had this bridge made informed another patient that he would not take a farm for it and be without it.

Besides being able to masticate the food better, patients claim they can talk better; it looks as though they could when they talk like the gentleman just referred to! This expression of satisfaction has come a number of times from patients who have had gold bridges replaced by the removable.

### WHAT BENEFIT IS IT TO THE PATIENT, PRACTITIONER AND THE PROFESSION?

To cut this subject short with what has gone before, a patient is able to get a comfortable denture that he would not be without for any price. The practitioner may ask a good fee for his work, and know that his patients appreciate what he has done for them; work has been done that ought to have the honest recommendation of the public and not be subject to any criticism.

*(To be continued)*

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# OUR DUTY IN PUBLIC DENTAL EDUCATION AND OUR RELATION TO THE PUBLIC PRESS.*

BY HOMER C. BROWN, D.D.S., COLUMBUS, OHIO

LIFE MAY be defined as the sum total of functional energy to resist death, and no individual can exist for any great length of time independent of the influence of others. To a certain extent, at least, we are "our brother's keeper," and our duty to our fellowman increases in proportion to our ability to render aid. This is in strict harmony with the parable of the "talents," the teachings of which are as applicable today as ever.

Our legal responsibility and our moral duty are two distinct propositions. Legally we are only required to comply with the legislative enactments regulating the practice of dentistry, and such general provisions of the statutes as safe-guard the interests of our citizenship. After becoming a legal practitioner the range in quality of service becomes quite elastic. Some make distinct progress and continually strive to render better service, which advances the interest of the individual and the profession. Others have reached their zenith when, with diploma and license, they make their professional debut.

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*Read before the Ohio State Dental Society, December, 1912.

Unfortunately, the "recall" is seldom resorted to in cases of incompetency and, if so, it is both difficult and embarrassing to secure favorable action. No one is legally required to use more than reasonable skill, and we are reminded that our highest court authorities have had some difficulty in clearly defining this word "reasonable." Thus, from the legal phase, we can only hope for such indirect influence as naturally follow the ordinary routine in becoming a legal practitioner, but our moral duty is an entirely different proposition and we must educate ourselves, if necessary, to take an active interest in public affairs generally, and especially in those that are so closely allied to our profession.

The question of Public Dental Education has been receiving considerable attention for some time, but it is my opinion that this educational propaganda has only begun. When the laity fully appreciate the detrimental influences of an unhygienic mouth upon the general health; when they realize that through the proper use and care of the teeth many pathological conditions may be corrected; when they become sufficiently informed as to understand that a child may be so trained in the use and care of the teeth that it will be possible to avoid much of the trouble which usually results from such neglect: then, and not until then, will our full duty to society be humanely discharged. But this condition is in such marked contrast to what exists today, and its accomplishment seems so completely removed from the field of present possibilities, that no one who believes that the laity should be well informed in such matters can offer the excuse that enough has been done.

In this connection I will quote from a paper entitled "Dental Inspection in Public Schools," which I read before the Columbus Dental Society about three years ago, as follows: "Two factors are largely reresponsible for the unhygienic conditions existing in the mouths of so many school children. First, ignorance on the part of the parents of the true existing conditions, as well as ignorance of the importance of observing hygienic precaution in this particular. Second, fear of pain in having many of these diseased conditions corrected. Both of these can very largely be eliminated by regular examination of the teeth of the school children, of from six to fifteen years of age, and the necessary treatment of the unhealthy conditions thus found, together with an outlined course of instruction in Oral Hygiene in the public schools.

"In my opinion, the item of expense plays little or no part, except only with indigent families, and provision should be made for these, as I am fully convinced that parents would make any reasonable sacrifice, if necessary, to correct such unhealthy conditions if they fully appreciated what such neglect meant to the child and realized by so doing that they would save it from unnecessary future suffering."

Much has been done in the past decade in safe-guarding the health interests of our citizenship, and much more will be done in the next. Municipal, state and federal authorities are beginning to appreciate that the "death rate" and the "tax rate" have a strikingly close relation and that the more healthy the nation, state or municipality the more happy and progressive will be its people. They, also, are beginning to appreciate that in conserving our natural resources the question of health should not be treated as an unnatural condition and be the last to be considered, and we hope the time will soon come when the child of today will have an equal chance with the dumb brute of the field. To some this statement may seem over-drawn, but it is only necessary to study governmental and state reports to be convinced of its truth by the precautions taken in eradicating hog cholera, tuberculosis in cattle, etc.

Why is this so? Simply because the drove of hogs and the herd of cattle have impressed themselves upon us as an asset, and the loss of anything representing a money value, from a preventable cause, is worthy of using such drastic measures as may be necessary to counteract it. I heartily commend the business and hunanitarian principle involved in such procedure, but since it can be very readily shown that every normal child is a distinct asset and every markedly deficient one a liability, therefore we trust that the handicap days of the child are numbered.

.Our cosmopolitan population complicates the situation and makes additional precautions necessary in order to keep up a high standard of health. The tendency of the "middle class," and those less fortunate, to congregate in thickly populated communities, as well as the influx to our country of the poorer element of foreigners, adds to the complication. The much discussed "high cost of living" plays its part, since many are forced to live under conditions which otherwise they might be able to improve. That drastic and forcible health regulations are frequently necessary, where contagious diseases and polluted water supplies exist, convinces us of the carelessness of many for their own safety, as well as a marked indifference as to the welfare of others. Also, it reminds us that less dangerous conditions, such as are under discussion, will require a very different and a long continued systematic effort to secure satisfactory results.

We recognize that the first and most important step in digestion begins in the mouth, and that favorable conditions are necessary before this can be successfully accomplished; that food masticated in a mouth with carious and ulcerated teeth, and diseased gums, becomes impregnated with bacteria and produces deleterious systemic effect; that chronic alveolar abscesses and impacted teeth frequently produce very serious pathological disturbances, and that irregular teeth and contracted arches are not only disfiguring, but result in impaired nutrition, mouth breathing, etc. However, it should not be necessary to further impress upon you the importance of a hygienic mouth nor the relation of our "field of operations" to the general systemic condition.

If we recognize the truth of these preliminary statements we must certainly recognize that, so far as this question is concerned, we are by teaching and practice best qualified to see that correct knowledge is given to the public. This being true, we are falling far short of our duty unless we render the aid that is naturally expected of us in this respect.

In summing up our duty in Public Dental Education, we might first state that there is much need of some of our energy being expended within our own ranks, as it is quite important that *all* dentists be impressed with the relation of a healthy mouth to the general health of the individual. In addition to this there is much to be gained by educating and encouraging the dentist to take an active interest in public affairs generally, as this will have a tendency to eliminate many of the petty jealousies that exist in many communities.

Some present were recently entertained at Dayton by the Miami Valley Dental Society and the National Cash Register Company. A number of mottoes are displayed in various parts of the Educational Hall of this progressive company, and the two following are distinctly applicable in this connection: "Education must come before progress" and "Team play is necessary to success." One of the important features in connection with our local dental organizations is that it not only brings together those practicing under similar environment, but we are stimulated to further educate and equip ourselves for team play and success. Also, it becomes possible to do things in the name of the organization instead of the individual.

// Generally speaking, the medical profession has only recently begun to look to the mouth and teeth as the source of some of the pathological conditions which they are called upon to treat, and we should be ever ready to co-operate with them in correcting such conditions as well as in other matters of mutual interest to both professions and the public. It is certainly appropriate for our local, state and national organizations to invite the general medical practitioner, the specialist or the surgeon to contribute to our programs, and, with some modesty we say that similar medical organizations might well consider the advisability of inviting the general dental practitioner, the othodontist or the prophylaxist to participate in their programs. I am impressed with the conviction that such interchange of ideas and courtesies cannot fail to be of mutual benefit to all. //

Next we come to the question of how can we best reach the public in such educational matters?

In discussing a paper on Education at the Fourth International Dental Congress at St. Louis, in 1904, page 496, Vol. III of the Transactions, I said: "* * * It is not a question of more dentists, but better qualified ones, who will, as dentists, become students and aid in any advanced movement, such as is before us today. Broadly speaking, education should not be confined entirely to our profession in order to accomplish the best results for our clientele and ourselves. The public have only a limited knowledge of us as a profession, and frequently less of the character of the organs which we are called upon to treat. They should not be censured, but have our sympathy, as glaring advertisements with various claims of superior ability, painless dentistry and the usual twenty-year guarantee are frequently all that they see relative to our profession. Articles prepared by men of reputation and ability, and published in the leading magazines of the day with the idea of educating the public, are within the province of education from a dental viewpoint and will accomplish much good. What percentage of parents recognize that the first molar is a permanent tooth? I refer to this as only one of the instances where ignorance exists. Oral Hygiene should be taught in our public schools, and much accomplished there from an educational standpoint, even though this teaching be limited in its nature."

In 1907, as president of the Ohio State Dental Society, I made several recommendations. That relating to Oral Hygiene was:

"I would also recommend that we should use our individual and united efforts to the end that Oral Hygiene may soon be recognized and taught as a requirement in our public schools; and further, that we should encourage members of our profession with recognized qualifications, to appear before schools, teachers' associations and such other organizations, as will aid in disseminating information which will be of benefit in directing the attention of the public to the proper personal, as well as professional care of the oral cavity and its organs."

I think that some of these methods are as applicable today as at the time they were made, and I repeat them here for what they may be worth. However, I do not contend that these are the only methods of merit, but that their application will effectively reach a certain class that should be thus educated. Some of the important steps that have been more recently inaugurated and which will prove effective in this work are, namely: The establishing of free dental clinics in schools, health departments and through charity organizations; the appointing of dental inspectors in the public schools; the publicity campaign as conducted in Illinois and Indiana and other places; the endowment and building of the Forsyth Dental Infirmary, and the recent undertaking of educating the public by the use of the moving picture. All of these cannot help but impress themselves upon the public and will collectively do much good.

Naturally, every new proposition has enthusiasts back of it or it would never get to the experimental stage, or at least not beyond that, and it is hardly to be expected that all of these would agree on just what is the proper procedure to bring about the best results. We are deeply indebted to the oral hygiene enthusiasts, but after having recently conferred with a number of these from different sections of the country, I could not help feeling that it was extremely unfortunate that so many felt that their individual plan was the only way. The Oral Hygiene Journal has done much to keep the profession advised of the work in different parts of the country and the editor endeavored to get some one to outline the one way best adapted to handle this question, but it seems as though this was a difficult task.

No doubt each individual plan has distinct merit, and when these various ideas are applied collectively we naturally can expect increased results, but the unfortunate thing is that collectively and under the most favorable conditions we can hardly hope to reach all. In the initial work we naturally first impress the benefits upon those most observing and those interested in such advanced movements, and this counts for much in the end. In this manner we may hope in due time for the hearty co-operation of the public press, and this brings me to the second division of my subject: Our Relation to the Public Press.

To some the necessity for discussing our relation to the press may not be apparent, but it does not require a very careful observer to note that most of the publicity accorded the dental profession is of such a nature that it neither reflects credit upon the writer, the press or our profession. Much of this is written in a jocular vein and is frequently quite misleading. The terms "tooth carpenters" and "yankers of teeth" that have so frequently been used, are both undignified and unprofessional, but fortunately the press, to a very great extent, has ceased to use these. We have been somewhat responsible for this, and it is hoped that it will not be long until our profession will assume a different attitude toward the press and co-operate with their representatives to the end that the possibility for misleading information will be reduced to the minimum. I have no disposition to lay all this responsibility on the shoulders of the press, since I appreciate the fact that they have been handicapped in their endeavors to secure correct information and at times have been treated so discourteously that we would not be surprised at them treating us more severely than they do. "To err is human," and dentists, like newspaper men and others, are hardly in a position to assume an attitude of "holier than thou," nor would such an attitude assist matters at this particular time.

Newspaper work calls for and develops individuals of more than average intelligence and ability. Their training frequently begins in the lowest positions and promotion is the usual recognition of qualification and faithful service. Such a newspaper man is thoroughly acquainted with the characteristics of his fellowman, and it is quite probable that most of these would agree that the average individual is not lacking in vanity or egotism; neither is selfishness a wholly unknown attribute. They, also, could possibly supply many of the missing links in frequent experiences where imaginary wounded feelings seems to predominate and questions are raised as to the source of information which seem (?) to greatly disturb the individual who has been the recipient of the "write up." One of the characteristics of the successful newspaper man is that he usually gets the "other fellow" to talk and knows full well how to keep a secret. They are most anxious for news and "scoops," but it is a very rare thing for a newspaper man to make use of information given him in confidence, and they are deserving of treatment which is generally accorded persons of their attainments and positions in life. In addition to this they are members of "the human family" and naturally resent what they consider discourteous treatment, and, as is frequently the case, they have the offending individual or organization at a decided disadvantage, and in some cases the action of a few brings discredit upon many.

The press of today is a power to be reckoned with in every walk of life, and its influence in moulding public opinion was never more potent. Naturally, it is desirous of rendering service to the greatest number and a surprisingly large per cent. of readers are prone to accept all articles as absolute facts and admit of no explanation or deviation. For this reason it is important that we should render every possible and legitimate assistance to the end that the reading public be as correctly informed as is possible. As a profession we should not be so ultra-ethical, or so exclusive, that others are continually misinformed concerning things which are of the utmost importance to their physical welfare, nor the usefulness of our profession be so seriously handicapped.

The general trend of the present is toward specialization, and this necessarily limits the individual's general knowledge in many of the things which would be of personal benefit. If those who have specialized and become proficient, refuse to give correct information concerning the things which are of decided benefit to the public and permit and encourage by their actions erroneous and misleading reports to go out to be accepted as authentic, then we as a profession and as individuals come far short of what should be expected of us.

It is encouraging that the public is becoming much more interested in these health questions and that interest is increasing in its dental phase. Many of our patients keep in closer touch with the progress of such matters, as well as our attitude toward them, than we may suspect, and they are surprised at our indifference. No doubt most of you may recall questions being asked regarding the supposed action of the National Dental Association in condemning tooth powders, pastes and mouth washes as sent out in a press report at the time of the Cleveland meeting, as well as similar but less conspicuous misrepresentation. When these misleading reports are sent out and those who know that they do not represent facts make no effort to correct them, the impression is anything but creditable to our profession. We appreciate that it is impossible to effectively correct unfavorable newspaper publicity, since some one is always responsible for the error and it is seldom that the correction receives the same consideration that was accorded the original article; therefore, the necessity for co-operating with press representatives with the idea of eliminating the possibilities of errors.

The public, like a jury, carefully considers the evidence presented before arriving at a verdict and when the preponderance of such evidence is on one side, with nothing offered in rebuttal, it can be easily understood how natural it is for the readers to arrive at a verdict which is decidedly unfavorable to our profession, our organizations and our social standing as individuals.

By faithful service to our clientele and by our organized efforts in advocating and supporting meritorious policies for general good, we have advanced, but it has been under a decided handicap. If we can do this under such a handicap, don't you think it possible to make a more rapid advancement under more favorable conditions?

The newspapers have an unquestionable right to adopt such policies and employ such methods as seem to them advisable or necessary in presenting the news to their readers, and it is difficult for them to understand that the ethics of our profession are so strikingly different from those of the other professions. The unjust attitude of a few of our profession frequently has an unfortunate bearing and result in strained relations, which are difficult to overcome. As an illustration of this I heard, some few years ago, one of our most prominent dentists tell a newspaper representative, who was requesting information, that: "It is none of your business, the newspaper's business or the public's business, who reads papers, gives clinics or responds to toasts before our societies, or who may be elected to office." This newspaper man replied: "You talk like a damn fool." Gentlemen, is not this and other similar experiences, which many of us might mention, a sufficient reason to account for much of what we consider unjust treatment by the press? Can a newspaper be consistently censured for insisting that we occupy the berth which we have been so particular to select?

Therefore, in view of the existing condition, the necessity for a better understanding and appreciation of each other's rights was never more apparent than at this time. That each have our place and will continue to render valuable service to mankind needs no argument, but it is time that our profession awakens to the fact that we have been occupying an awkward position in our relation to the press and through them to the public.

This paper has been written with the view of presenting some phases of the question, which seemingly have not received sufficient consideration, in the hope that the relations of each to the other may be better understood. With this purpose in view we trust that some better understanding may result from the discussion of the subject and that we will not long continue to occupy an entirely defensive position and be subjected to the attacks of those who are well supplied with ammunition and in possession of the "rapid fire guns."

### ABSTRACT OF DISCUSSION.

**Dr. L. L. Barber**, Toledo: The essayist's definition of life, while it may not be all that some think, to me is a very pat one.

It is true that an individual can not long exist without being more or less dependent on and influenced by others; nevertheless there are people, and by no means a small per cent. of them, that think they can live without being dependent on or being influenced by others, but others cannot live without them or their influence.

There is a business house in New York City that has on its walls this notice: "Whenever you think you have become indispensible to this concern you are on the toboggan." So it is all through life.

It is not the busy man that does not have time to polish his shoes or go to a dental meeting, nor is it the busy man that has not the time to give to public dental education. Likewise the busy man is not shocked when he hears of some one else getting a bit of notice even though it be very proper notice.

Dr. Brown has well said that our legal and moral responsibilities are two different things. It is a good thing we have a legal responsibility, for if it were not for that, God help many a poor person; for moral responsibility, to say nothing of the sense of *duty,* has not, as yet, reached its flood tide. And as long as some persons can keep from doing the things that will put them behind the bars of justice, and at the same time make money, they think they are all right; but are they? Or do they think that such practices cover their moral duty?

In my judgment when a person receives a dental degree, and thus has fulfilled the first legal requirements of his state, he has simply received a license to go forth and study his chosen profession.

God pity the one who thinks that the practice of dentistry consists of only such things as will bring him the most dollars (perhaps I should say cents).

If the time ever comes when I do not want to do anything for anyone unless I get some monetary return for it, I trust the Lord will take me home, if He has a home for such persons.

The recall, as Dr. Brown calls it, is seldom called into use, it is true; but you can take the best bill, for the safety of the general public, that it would be possible to frame, start to get it made into a law, and you could call and recall it again and again; and when it came out of that hopper I will wager you anything its own father wouldn't know it from a jack rabbit. And there is a reason for the existence of that condition of affairs. You know the public press and its representatives, as Dr. Brown says, is a power that must be reckoned with; and I have found these representatives quite ready, if they have the courteous treatment we ourselves would demand, to do the things that will be of benefit to the general public. Of course you must so treat the newspaper representative as to make him see that it is going to be a benefit to the public, and the wind will be more in your favor and you will not have to tack half as far. Remember the newspaper man has a good head and a thinking machine as well as we have, and if our reasons are better than his, we are quite sure to make him see it our way.

The question of public dental education has about as many different phases as it has advocates, and I have mine; I believe first of all that if we, as individuals, would inform ourselves on the subject and then give a little time to explain and demonstrate, if necessary, the soil we so much wish to be fertile would much more quickly become inoculated with the germ that would make dental education of the public grow fast and furious, and to such an extent that the state officials would pay not only as much as, but more attention to it than they do to hog cholera and cow tuberculosis.

Dr. Brown very ably refers to the conditions of the parts of our cities that are over-crowded, and the parts that are populated by foreigners of the so-called less desirable class. They must be taught that the selfsame things which induced them to leave an undesirable country should induce them to help to make this country all that they expected it to be; and certainly health, the mouth included, is one thing that makes it a more desirable place to live in.

All that the essayist says about school examination, polluted water, digestion, carious and ulcerated teeth, diseased gums, etc., is, of course, absolutely correct and true.

In regard to the medical profession, it is quite like our own; they have good, bad and indifferent members. But generally speaking, the medical men (at least the younger ones) are more free to consult with one another and refer patients when in their judgment occasion requires it, than the dental men are.

It is true that medical men have but recently begun to look to the mouth and teeth as the source of many of the ills that flesh is heir to, but how many dentists, until very recently, have looked to very many conditions except the mere filling or extracting of teeth and the making of artificial ones?

You know that sharpening a razor is a process of friction, and so rubbing up against the medical men will sharpen us as well as vice versa.

What Dr. Brown recommended in his address when he was president of the Ohio State Society regarding oral hygiene in the public schools is coming true, and I wish it could have been the privilege of each one of you to have seen the exhibits and heard the papers and discussions pertaining to those things that Dr. Brown and myself heard and saw in Washington at the late Health Congress.

And, by the way, we must not overlook the work that is being done here in Cincinnati along this line, for it represents an immense amount of work, and not the two dollar for one kind either; and personally I want to congratulate Cincinnati on the kind of men it has in the dental profession.

The essayist speaks of the *Oral Hygiene* Journal and its editor; well, any one who knows Ed. Hunt knows he is some informer.

The moving picture part I will leave for my friend, Dr. Zarbaugh to attend to.

Dr. Brown has quite the correct diagnosis of most of the publicity given to dental meetings. It is quite as important that the rank and file of the dental profession be as correctly informed, for there are and have been men whose names stand high on our dental rosters whose claims in papers I have heard them read came no nearer conveying the real ''honest-injen'' truth than do some of the newspapers.

The newspapers are probably saying what they believe to be the truth, and let us hope that the men who read the papers and give clinics do the same.

I am somewhat like the old darkey that had the parson to dine with him, and for dinner they had a very fine chicken. The parson said: ''Brother Jones, whar did you get this fine chicken?'' Brother Jones replied: ''Brother Johnson, when you happen to have a fine sermon I never does ask you where you done got it, does I?''

So I say, do not be too critical where or how we get the good things, but be very particular to pass them on to some one else, and thus help to bring the public to a higher plane of moral and hygienic living.

**Dr. S. D. Ruggles**, Portsmouth: Dr. Brown has given us a very clear and comprehensive exposition of our duties on education toward the public in general and the daily press. This subject has been uppermost in his mind for years and it is a privilege to hear it from one so well versed and enthusiastic.

Concerning the education of the public: Perhaps it would not be amiss to stop at this time and consider that word, Educate. It is derived from a Latin word, ''educo,'' which means to draw out. Please bear this in mind for a moment.

During the past ten or fifteen years it has been my custom to teach patients how to use a brush in order to clean their teeth properly. Several brushes of different size are kept on hand for these demonstrations, and especial emphasis is laid upon the molars, where so much interference is met with on account of the buccinator muscle when an attempt is made to open the mouth to any extent. By complete relaxation of this muscle there is no trouble encountered in thoroughly brushing even the third molars. Well, to make a long story short, this was done so often that the peridental membrane on my third molar gave way to the continued strain and I was compelled to call on one of my fellow practitioners for relief, and *educo,* out it came. That, gentlemen, is one side of dental education.

Now for the daily press: A few years ago the president of our Kindergarten Association came to me with a request for a lecture on Oral Hygiene and Infant Dentition. This was to be given as a benefit, for they were always hard pressed for funds. Of course it was a good cause and it appeared to be a good opportunity to scatter a few thoughts which might benefit a great many people, mothers especially.

The Northwestern University loaned me twice as many slides as were needed, and to a novice everything indicated a very interesting evening. The slides were carefully arranged, notes made to conform thereto, and a small light placed in a box in order to follow them. (It is one thing to talk with the lights on and quite a different thing when they are off.)

In order to insure a crowd the ladies sold the tickets for ten cents. Trouble started that very day, for it was not my intention to give a cheap show. The night finally arrived and with it a continuous downpour of rain.

The ''standing room only'' sign was not needed. To make a bad matter worse the small lamp provided for my notes refused to work and the whole thing had to be extemporaneous. However, the daily papers wrote it up in such shape that those who failed to come felt that they had missed the one opportunity of a lifetime.

Dr. Ebersole, Cleveland: I have listened with a great deal of interest to this paper and I want to say that I think it is one of the most important papers that has been presented to this society for a long time.

Our attitude toward the public press has not been what it should have been.

Our relation to the public health questions of the country seems never to have been thoroughly understood by the dental profession. We have not made the most of the opportunity that has been afforded us. Dr. Dole, ex-Commissioner of Health of New York City, makes the statement that 4% of the people of this country die from incurable diseases, and that 92% die from preventable diseases. This means, ladies and gentlemen, that but 4% of the American people die from natural causes. Less than a year ago this country was shocked by the terrible Titanic disaster, when some 1,600 lives were lost. Business was almost paralyzed. The newspapers were filled with the discussion of this terrible disaster. It was on the lips of every one and the shock was felt throughout the world. But I want to say to you that as great as was the loss of life upon that occasion, statistics at command show that from preventable diseases alone, more people are destroyed every twenty-four hours than were destroyed by the Titanic disaster. More than 600,000 people die annually from preventable diseases. More inhabitants are wiped out each year than are contained in Cincinnati. These are facts, not mere fancies, ladies and gentlemen. In the prevention of disease no organ in the human body wields a greater influence than the human mouth. And there is no profession on God's green foot-stool today that should play so important a part in dealing with the health problems of this country as the dental profession. If we are not recognized by the public today in this capacity it is because we have not done our full duty to mankind. But I want to say to you that through the publicity work which has been done by the National Mouth Hygiene Association the great National Public Health Service of this country has been opened up to the dental profession to such an extent that we have at the present time a request from Surgeon-General Rupert Blue for graduates of dentistry who are also graduates of medicine to take the examination to go into the health service and work out problems relative to the relation that Mouth Hygiene bears to the general hygiene of the body.

The essayist states that we have not been able to find a means whereby the profession could co-operate with the Oral Hygiene people of the country. This was true a year or so ago. In fact, it was true a few months ago; but it is not true now, for we have an organization today to which belongs practically every prominent Mouth Hygiene man in the country. If all these men have become members of that organization it must be founded on a principle which these men from experience feel will be successful in the work undertaken. By becoming members they have endorsed the Association, and by so doing show that they feel that the organization is capable of handling the Mouth Hygiene movement of the country. I refer to the National Mouth Hygiene Association.

Just think of all the care and attention that has been given to fighting tuberculosis. Think what the medical men have worked against in this connection. They could not get co-operation in fighting this terrible plague until at their suggestion there was formed a national organization which would permit the co-operation of the medical profession and the laymen in a campaign to wipe out that terrible scourge. When the Anti-Tuberculosis League was formed, the people began to take cognizance of the work that needed to be done. It was then that they were able to accomplish something. Last year the Anti-Tuberculosis League and allied societies for prevention of tuberculosis, spent $14,000,000 in their fight against this dreaded disease.

Seventy-five per cent. of the organisms which produce preventable diseases enter the human system through the oral cavity, the mouth, the organ over which we, as dentists, preside, and for the condition of which we are directly or indirectly responsible.

In our fight we deal not alone with tuberculosis; but in handling the mouth, in treating the mouth, and in teaching cleanliness of the mouth, we deal with that which will prevent in a great measure all diseases.

I am glad to have the essayist take the position he does relative to the public press. I want to have all men in the profession take that stand with regard to the public press. In the printed matter sent out by the Oral Hygiene Committee of the National Dental Association, some few years ago, the committee made the statement that in its fight for the prevention of disease it made use of the three greatest educational institutions of the country—the Public School, the Public Press, and the Public Platform. At that time the public theatre screen was not at our command; but last year we added to the above list the Motion Picture Screen. So today we have four of the greatest educational institutions of the country in use for the National Mouth Hygiene Association.

In the past the dental profession has devoted much time and attention to repairing faulty conditions of the mouth, and God knows, there is necessity enough for giving attention to that line of work. But today we are turning our attention to preventing these conditions. There are not enough dentists in the country to take care of the people in New York City alone. This being true, how are we to handle the great proposition which is before us? It is by prevention. There is no one power that will help us so much in this connection as the public press. And I want to say to you that the publishers of the newspapers throughout the country will give you due credit if you treat their reporters courteously and as gentlemen, and give them the information to which the public is entitled. The statement of the reporter—that the man who would not give intelligent information to the public is a d.... fool—is correct. We have played the part of the d.... fool to the detriment of both the profession and humanity.

Ladies and gentlemen, the time for co-operation in the interest of the profession and humanity is at hand, and the following out of just such recommendations as those being made by the essayist will bring about the desired end.

Dr. H. C. Sexton, Shelbyville, Ind: I have enjoyed Dr. Brown's paper very much. He has shed some interesting light upon the subject. It is such a big subject, however, and in some of its phases so complicated, that no one yet has ever been able to solve all of its riddles.

I am sorry that Dr. G. E. Hunt isn't here, for he must have some quite original ideas along these lines. A few weeks ago I was talking to him in Indianapolis, and he asked me if I had any solution for the public press advertising business. I said, "No, I haven't." "Well," he said, "I have." I asked him what it was and he said: "No, I'll not tell you, because if I do you'll steal my thunder and write it up yourself. You wait until you read my article sometime."

But even if I haven't a complete solution of the vexing question of our relations with the public press, as has my friend Hunt, yet I have a few ideas of my own and you can take them for what they may be worth.

In the first place I think there is one great cause of dissension between professional men and newspaper men that Dr. Brown has failed to mention. All newspapers are supported by their advertising. The money derived from subscriptions would not keep any newspaper in this country alive a day. The commodity they sell is advertising, and all the better dentists frown down upon that commodity as something unworthy of them. Such opposing interests and views are enough to set these two classes at loggerheads. It is a wonder the newspapers treat us as well as they do.

Now my remedy for this is for dentists and editors to get together and understand each other. The editor or reporter who looks upon a dentist who will not advertise as an intolerant, narrow-minded bigot fails to understand the difference between a merchant's advertising goods not the product of his own brain or skill and a professional man's advertising what is entirely the product of his own brain or his own skill. The merchant can advertise and still be in every sense a modest, worthy gentleman; but when the professional man advertises he at once stamps himself a conceited egotist and quack.

The public press is the greatest power in the world today in forming public opinion. The church isn't in it with the press. Possibly one-third of us go to church once in a week, but all seven days in the week every one of us is influenced by his favorite paper. It is a shame that we professional men have alienated from us this great power—needlessly alienated it. I do not want professional men to become personal advertisers, that isn't necessary. But when professional men have a great, a wonderful message for the public as we dentists have today, we are fools not to use the press to convey that message to the public. But instead of using it to our own advantage and to the help of ignorant, suffering mankind, we have turned this great power of the modern press all over to the most disreputable element of our profession—the quacks. We have acted like idiots. We need to wake up. We should make use of this powerful engine of modern civilization to educate the public in oral hygiene. In that great work the newspaper and the dentist should be hand in hand. Let us rent space in the papers to carry to the people this great message. If only we do this then our friends, the editors, will cease to look upon us as bigoted prunes and become friends indeed.

The one great stumbling block to the dentists using the columns of the newspaper to teach the public the proper care of their mouths has been our code of ethics. Now that code always did make me mad. It seems so small and belittling. There are too many *don'ts* in it and not enough *do's*. In that it is somewhat like the Ten Commandments, seven of which, if I remember correctly, are negative.

In this lively age we need to be told what to do, instead of what not to do. We are too thin-skinned about this code of ethics. Instead of turning this great power of the press over to the quacks we should get busy and use it for the enlightenment of the world on dental matters. We should take off our ethical blinders and look at this great, practical, bustling world as it actually is. Instead of expecting the papers to write up our meetings free and then kicking when the write-up doesn't suit us, let us prepare popular articles ourselves, rent prominent spaces in the papers and pay good money for the service. In but a short time the public would realize the importance of dental work as it never realized it before and the newspaper man would be turned from a scoffer and an enemy into a warm supporter and a friend.

Dr. E. W. Martindale, Columbus: I have been very much pleased with the attitude taken by the essayist and those who have discussed his paper this afternoon. As one who has been interested for some time in this kind of work, it gives me great pleasure to hear such encouraging words from those who have preceded me. I believe we, as dentists, cannot do this work alone, and suspect that there is a ready and willing hand on the part of the medical profession to aid us. Some months ago it was my privilege in rather an unfortunate way, perhaps, to read a paper before the Ohio Eclectic Medical Association. I found the members of that organization showing a willing attitude to discuss my paper, the subject of which was, "The Care of Children's Teeth." The great advancement made in dentistry within the past few years has aroused a desire to know more about the care and treatment of teeth, both by the laity and the medical fraternity. It is especially noticeable in the interest of parents for the care of the children's teeth as noted by the many inquiries they make. The interest shown by the physician is very much in evidence from every side, especially members of the health boards and inspectors whose duties bring them so closely in contact with the general health. The National Mouth Hygiene Association has endorsed this work and their plans as outlined will bring in activity a vast army of helpers to boost the cause forward. This work must, of necessity, be pushed along by those of our profession who do not fear criticism and the possibility that they may be placed in the lime light. Dr. Brown has suggested this in his paper and calls attention to the fear of publicity on the part of the members of our profession. No man or woman who is engaged in this work can give their time and effort to it if they have not a thorough understanding, and not appear to be in the lime light; but the work, if accomplished with a degree of success it deserves, will place those who are most actively engaged before the public in a way that may seem to outsiders somewhat repugnant. There is, however, no occasion for such an attitude being maintained. We are not able to take care of this work and accomplish best results as a medical or dental profession jointly, but it is up to us to provide some means whereby we can be aided by the laity in accomplishing the results. This may be in a large measure cared for under the plan suggested previously in mention of the work and plans of the National Mouth Hygiene Association by enlisting a great army to work from all classes. An article in the papers recently, commenting on the recent convention in Washington of hygiene and demography called attention to the fact that there were 600,000 lives taken each year by diseases which were preventable, and this was a sociological question. The emphasis brought out was that it is necessary to have the co-operation of the laity in a subject that was so vitally related to the public at large. I am very glad to see this society take the interest which is shown today and I believe advancements will be made in the next few months which will accomplish more than has been done in the past in as many years.

I predict also that the time is not very far in advance when there will be such a clamor for instruction and help along the lines of mouth hygiene as will make it almost impossible for our present numbers in the profession to cope with it adequately. This, then, should arouse us to be ready and willing to do our part in stemming the tide of a great destruction as indicated by the death rate in this country. I also hope that Ohio will be in the forefront, and show it by the appointment of a Public Dental Educational Committee which will rank favorably with other standing committees we have each year.

Dr. H. C. Brown: In closing this discussion, I wish to take but little of your time. Dr. Barber referred to the individual who could not render service without the hope of remuneration. I was, indeed, very glad to hear him state that so clearly. If we are going to be so selfish in what we do, as we go through life, that we are constantly looking for our financial reward, then, like Dr. Barber, I say if there is a place for such of us as take this view of our duty to our fellow man, I think it is an appropriate time that we be called to our reward, if such there be for us.

In reference to the ''recall,'' I referred to this in connection with the revoking of licenses. You understand that it is very easy to take an applicant into our society, but it is a much more difficult proposition to get a member out. This is exaggerated when it comes to a person holding a license and where occasion arises for the revoking of this. Our law makes provision for the revoking of a license under certain conditions and I am very glad that this was incorporated.

This revoking authority may not be often used, but it is there when it is required. On the other hand such provision is a distinct check to those who may be encroaching upon the danger line and is a strong argument in the hands of friends of such an individual, since it makes it possible for them to remind the one in danger of the possibility of having his license revoked.

In reference to the closer relations of the medical profession, I think this is quite true. They are naturally brought in more direct contact with each other and there is no question but what there is a greater necessity for consultation in the medical profession than with the dental, as they come in closer touch with life and death. The suggestion I made with reference to our organizations and the medical organizations co-operating, I think will prove an advantage to both professions, and what is an advantage to us will certainly be a benefit to the public.

I have always understood that Dr. Ruggles received fees commensurate with his recognized ability and am not surprised that he should have been selected to make the address to which he referred, but am chagrined that the citizens of Portsmouth should place such a low value on his ''drawing'' ability as a lecturer. If the admission fee had been $1.00, instead of 10 cents, you might have expected ''standing room only'' signs displayed, as the citizens of that section of the state do not expect much from Ruggles for 10 cents. One of his plans for educating the public proved to be rather an expensive one, since his method of demonstrating the use of the tooth brush resulted in the loss of a ''wisdom tooth.'' It might have been permissible to tell his 10-cent audience of the loss of this ''wisdom tooth,'' but we would have more fully appreciated his great personal sacrifice, for educational purposes, had he referred to this as a third molar.

Dr. Sexton has done a great deal of educational work in Indiana, and like him, I regret that Dr. Hunt is not here to discuss this subject, as he has been doing so much in furthering the oral hygiene question.

I agree with Dr. Martindale that, in securing publicity of educational value, it is sometimes impossible to wholly eliminate the individual or individuals who may be closely connected with such work, and we should not be too critical in passing judgment upon others. This reminds me of a little poem written by a prisoner in the Ohio Penitentiary, entitled, ''An Optimist's Admonition,'' as follows:

Don't look for the flaws as you go through life,
And even should you find them,
It's wise to be kind and sometimes blind,
And look for their virtues behind them.
''The cloudiest night'' has a hint of light
Somewhere in the ''shadows'' hiding,
It's better by far to look for a star,
Than for the spots on the sun abiding.

"The river of time" moves ever along
To the bosom of "God's mighty ocean."
Don't try your force " 'gainst the river's course"
Or think to alter its motion!
Don't waste a curse on this universe;
Remember it lived before you.
"Don't butt the storm" with your puny form,
But bend and let it go o'er you.

This world will never adjust itself
To suit your whim to the letter.
Some things will go wrong, "your whole life long,"
And the sooner you know it the better.
Don't try and fight "with the Infinite"
And at last go down in the wrestle.
The wisest man shapens into God's plan
As water shapens into a vessel.

# HOW TO GET NEW PATRONS *

BY F. A. KELLER, D. D. S., GARYVILLE, LA.

After a dentist has been in practice for a few years, nearly all those for whom he performs services are his regular clients who come as occasion demands to have such work performed as may be necessary, and there are few who are strangers to him.

Many men become, by years at attention to their professional duties, inattentive to the details of practice as they improve from year to year. To think that because a man has made a good reputation he can therefore rest on his oars is a very fallacious idea. The man who has earned a reputation has to work just as hard thereafter to hold the desirable clientele which he may have attracted; he must maintain the standard of work upon which his reputation is founded and to do this he is compelled to give as close attention as ever for he is always liable to have his work compared with that of others and criticised more freely than if it were the work of a less prominent person.

After having gained an average practice it may be difficult to make it larger because to do so may mean to attract patronage from other dentists or to attract those who do not as yet form a part of the dental constituency. This is no easy matter in a practice conducted upon ethical principles, and when it is considered, too, that other dentists are exerting themselves in the same manner.

The highest grade of service, conscientiously maintained year in and year out, is always a powerful factor in influencing the patronage of those who are desirable clients. Every dentist should bear in mind that one filling may be judged as a sample of his ability: that when he inserts the filling he does not know who will be impressed with its artistic ap-

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*Read before the Louisiana State Dental Society, 1912.

pearance, or who may observe that it lacks in beauty or correctness; that one small filling may be the means of ultimately attracting a large amount of patronage, or of repelling it, and he cannot tell which of a thousand fillings it may be, therefore he must give equal attention and skill to each so that it makes no difference which one is observed, all will be good and equally worthy of praise.

The means by which new patronage is attracted are dependent upon the dentist himself. It must be because of some inherent force of the individual, the man himself, who does the work, that people are attracted to him.

People who have never patronized a dentist who is in full practice are attracted to him in the first place because he is reputed to be skilful and stands well in his profession; in short, because he has gained what all are striving for—reputation. Another feature that attracts patronage is to be always well dressed, neat and prosperous looking.

Another quality of attractiveness in a dentist is affability and a social side to his nature. The gift of making friends is a very valuable one. A pompous, or cold, or cheerless, or heartless, or indifferent manner toward people, or a studied or sanctimonious isolation from them socially, or failure to recognize would-be friends on the streets or elsewhere, as if from a lofty independence or as if they were inferior mortals, often gives unmeant offense. A dentist who cannot in some way make friends, and awaken faith in himself, will assuredly fail. The reputation of being a "very nice man" makes friends of everybody, and is with many even more potent than skill.

To be both affable in manner and skilful in action makes a very strong combination, and one that is apt to waft its possessor up to the top wave of professional success. If his manner and conversation are of the gentle, soft and tender kind that will win and conciliate rather than repel children it will be fortunate, and will probably put many a dollar into his pocket that he would not otherwise have received.

The social side of his nature should therefore be cultivated and he should extend his fraternal connections as a most important consideration in his social and professional life; because he has a large practice he should not disregard this point, or some one else may gain the patronage of one or more of his most desirable families.

It will be found hurtful to the business interests of the practice to become identified with politics; for politics, even when honorably pursued, are injurious to a dentist's prospects. Besides escaping many anxious hours and bitter disappointments, he can in the long run make ten friends and ten dollars by being no man's man, and calmly sticking to his profession while he is making one of either in the polluted waters of party politics.

Avoid also the expression of radical views, and do not display political or religious emblems or portraits, etc., about the office, because these relate to personal sentiments—being emphatically a public man, and his office a public place, not for any class. Difference in religion or politics has often prevented the employment of dentists, or caused patients to leave them; and the obtrusion of unpopular political views has marred the prospects of many—besides, what is popular today may be unpopular tomorrow, therefore the dentist should keep his heart and his office open to all denominations and to all parties.

Failure to be at the office promptly in the morning has caused loss of patronage. People who seek a dentist early in the morning because suffering, will not wait and prolong their suffering for the sake of having any particular dentist—what they want is relief, and they will go on till they find a dentist who is in his office.

Frequent hunting and fishing trips are likely to cause a loss of patronage, for if a patient is suffering and must have relief, and goes to another dentist and there finds out that he is skilful, gentle and careful, and that he gives relief, he is likely to be impressed and to go to him in the future. Be careful in this respect towards other dentists, and when the patient of another applies to you because of temporary absence or sickness of the family dentist, do such work as may be necessary to relieve them or their suffering and let them return to the family dentist without anything being done which could, in any way, be construed as disparaging to the other practitioner.

Sometimes, after a dentist has been in practice for a few years, he finds that he is losing patronage. It will, in many instances, be found that clients have gone to other dentists because they have been attracted by favorable reports concerning their superior ability. A younger practitioner may have located in the community and because of the real or supposed possession of more up-to-date methods, he may gain patrons from the old established practitioners. If the older practitioner lacks familiarity with the more recently accepted ideas in practice, he will find it to his advantage to consult or enter the office of a prominent dentist in a city, where he can acquaint himself with the methods of such operators, thereby keeping abreast of the latest improvements.

Keep in mind the influence and good will of physicians and do everything to maintain friendly relations with them. Influence is one of the most powerful success factors which a dentist can have and is especially valuable in aiding him to gain new clients.

A kindly word spoken by persons of wealth or position indicating their preference for a certain physician or dentist, is given great weight, because of their prominence. Druggists can recommend a great many patients to a dentist in the course of a year and it should be the aim of the practitioner to do all in his power to return the kindness by referring as many customers to the druggist as possible.

Be especially careful to cultivate the good will of the children and to treat them with every consideration that would be accorded grown people. Take the little ones into your confidence and by so doing as they grow up they will esteem you as a friend and their influence will be valuable.

Remember that patience is one of the greatest virtues a dentist can have and that it may be the one virtue that may attract to him much patronage. Patience is an especially desirable characteristic in the treatment of lady patients, and it will hold patronage and attract new patronage where the possession of the highest professional abilities, coupled with the lack of patience, fails to add to their practice or reputation.

Conduct your practice on the basis of conservatism; this will commend you not alone to the layman, but to the professional man as well; by being conservative you will never promise great results, your work and you will never be charged with not equaling your claims for it. Remember that plate work and bridge work, especially plate work, demands as close attention as the most exacting operative procedures, and that a good reputation for doing plate work will attract the patronage of all those persons who are nearing middle life, because it is usually at that period that plate work is needed. Having secured the influence of these, the younger members of the family are likewise gained because the elders pay the bills, and if their work is satisfactory they will send those who are dependent upon them to the same dentist.

Try hard to be the first dentist in your own town; in doing this you gain all the professional esteem and moneyed worth that is to be had in the practice of dentistry. You cannot do more than this if you practice in the largest city in the world.

## DENTIFRICE AND TOOTH BRUSHES*

BY W. A. CHAMBERLAIN, ST. LOUIS, MO.

THE object of a dentifrice is to aid mechanically as well as chemically in keeping the teeth clean and the oral cavity in a hygienic condition. The other accessories are a properly constructed tooth brush and dental floss. As we know, decay of the teeth is due to the action of bacteria, and we also know that a great many diseases man is heir to are due to pathogenic germs which find entrance into the body through the oral cavity.

The thermal conditions are always present. First the germs lodge in the oral cavity where they become virile or attenuated according to the conditions found there. If there is a good medium or pabulum present, which in this case is composed of food accumulations around and between the teeth, as well as the same medium on the upper surface of the tongue, due to its papillary formation, then the germs become prolific and virile, and may enter the system, causing disease. Tuberculosis, pneumonia, typhoid fever, pus infections of the stomach and alimentary canal are illustrations of what happens. Diphtheria germs flourish in such mouths and in the debris of cavities, infecting the individual and spreading the disease after the individual has recovered, and been sent out among his fellows as being perfectly safe.

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*Read before the St. Louis Society of Dental Science.

On the contrary, if there is an absence in the oral cavity of bacterial pabulum, germs do not propagate, but become attenuated or weak, being overcome by body resistance.

According to W. D. Miller a single germ may produce in 24 hours 16 million offspring, while Novy has estimated the amount of organic matter present in 30 billion bacteria equal to about 1-400 grain. It is impossible to keep the oral cavity germ-free, but by carrying out the present-day idea of oral hygiene, those germs can be kept to a minimum number, and in a low degree of virility. This is called preventive dentistry or preventive medicine, whichever you please. Body resistance has much to do with infectious diseases, and an unclean oral cavity has much to do with body resistance, as it affords the germs an opportunity of preparing a favorable body condition for a successful campaign, through their toxins and the putrefactive toxins which are carried into the stomach and alimentary tract by food. Aside from the body effect of an unclean oral cavity, there is the matter of tooth decay and a disease of the gums known as marginal gingivitis, gingivitis, interstitial gingivitis, phagedenic pericementitis and pyorrhea alveolaris, according to the degree of inflammation of tissues involved. Then there is salivary calculus, which, according to the present theory, is caused by a precipitation of the calcium salts from the saliva by lactic acid produced in the mouth. Lactic acid is brought about by bacterial growth.

A large percentage of pyorrhea is due to local causes meaning irritation from food deposits and salivary calculus. This irritation results in inflammation which in turn produces serumal calculus.

The absorption of bacterial toxins, as well as putrefactive toxins, results in autointoxication, which, according to Talbot, produces an irritation in the pericementum and alveolar process. Irritation of any tissue causes inflammation, and in this case the pericementitis produces serumal calculus, which in turn adds to the irritation and the formation of pus pockets along the roots of teeth. Hence oral conditions act directly and indirectly on the teeth and gums.

In decay of the teeth there must be three elements present: germs, warmth and a medium for germ growth. The first two are always present, and can not be controlled, while the latter is within control. We do know that much about decay, and we do know that clean teeth cannot decay. We also know that in some mouths the three elements are always present with no decay; yet germ growth goes on and the disease-producing conditions go on. It seems evident that systemic conditions affect the saliva, which in time favors or inhibits decay. Whether or not this is due to potassium sulpho cyanate, men in research work are not agreed: or whether it is due to the quantity or quality of the saliva is not proven.

It is axiomatic that a smooth surface is one on which deposits do not form as readily as otherwise; hence a dentifrice should have a polishing property. Grit of any nature should be eliminated from its composition. Dr. W. D. Miller, after much scientific investigation, came to this conclusion: that a dentifrice for daily use should not contain any grit. He arrived at this conclusion after the most convincing experiments. He ascertained, first of all, the actual length of time spent by the average person in brushing the teeth during his life. Then by clamping teeth in a vise he applied a brush to them by means of a motor in a manner as nearly as possible similar to the usual method. In using the various dentifrices on the market, he found that some cut the teeth badly, varying in damage according to the amount of grit in the preparation.

Teeth with deep cuts and grooves have been observed by every dentist, and are due to the wrong use of tooth brush and an improper dentifrice. When once a groove begins it grows deep very rapidly, because the bristles of the brush, loaded with the gritty dentifrice, are pressed closely together in going through the cut, thereby affording a greater abrasive effect. Precipitated chalk seems to afford the best scouring and polishing ingredient for a dentifrice with the minimum cutting effect.

Soap should also be an ingredient; sterile castile soap. It is a detergent; it dissolves fat. The capsule of germs contains fatty substance. Lysol, which is widely known as a strong germicidal agent, is a saponified mixture of cresol and linseed oil. Its high germicidal power is due to the softening effect the soapy constituent has on the capsule of bacteria which allows the cresol to penetrate. The same holds good in a dentifrice. In addition to soap and precipitated chalk, there should be antiseptics. There should be a pleasant flavoring. These ingredients can be made into a powder or a paste, but I prefer a paste. In a paste glycerine is added as a massing ingredient, and in addition to this it has slight antiseptic properties.

All the old-time dentifrices were a mixture of prepared chalk, orris root and some flavoring as wintergreen or peppermint. Orris root was added because of its pleasant odor, and the belief in its tonic effect on the gums. Such vegetable powders should not be used, as they contain starch which might remain between the teeth and afford a pabulum for bacteria.

Another ingredient which is sometimes employed, and whose beneficial properties are over-estimated, is potassium chlorate. It is neutral in reaction and only slightly antiseptic. It is indicated in stomatitis but for daily use it is contraindicated.

Prinz writes: "Recently a tooth paste containing 50 per cent. of potassium chlorate has been widely advertised as an oral antiseptic. The pharmacologic action of potassium chlorate is erroneously attributed to nascent oxygen which, it is claimed, is set free after it is absorbed by the tissues. Potassium chlorate has no more value in the oral cavity than an equal amount of sodium chlorid, and besides, is a specific blood poison. After its absorption into the blood it changes oxyhemoglobin into methemoglobin, and produces multiple destruction of red blood cells. Clinical observation has further demonstrated the fact that the continuous use of this paste, aside from its disagreeable salty taste, produces inflamed and easily bleeding gum margins. The poisonous nature of potassium chlorate is manifested in a number of deaths which have resulted from its absorption when applied in solution or in substance on the oral mucous membranes.''

Those dentifrices containing calcium dioxide either do not liberate free oxygen on breaking up or produce substances which are injurious.

A dentifrice with the following ingredients would seem to meet all the requirements:

Soap
Precipitated Chalk
Absolute Alcohol
Glycerine
Benzoic Acid
Eucalyptus Oil
Saccharine
Oil of Lemon
Thymol

This preparation is germicidal as well as antiseptic and is not in the slightest injurious to the hard or soft tissue of the mouth. Teeth decay where they are habitually unclean, and in structural defects. This is a scientific fact. Hence in cleaning the teeth it should be done in a manner which reaches every surface and can be accomplished by means of a properly constructed tooth brush, dental floss and a dentifrice. The wrong use of a tooth brush causes much damage to teeth and gums. Brushing across the teeth cleanses the minimum tooth surface, besides packing food remains between the teeth and around certain bell-shaped and malposed teeth, pushing the gum back away from its normal line.

The most susceptible point for decay is on the approximal surfaces. On the other surfaces the excursion of food across the tooth surface in the act of chewing has a cleansing effect. The approximal surfaces do not enjoy this action. Another sheltered place is next to the gum margin. According to these conditions a tooth brush should be constructed with the bristles arranged in tufts or rows running across the brush, instead of lengthwise. The bristles should vary in length, the short ones on the sides and the long ones along the middle. They should also be graduated in length from long toward the handle to short at the end.

With this type of brush used by starting it on the gums and sweeping down over the teeth with a rolling motion, the approximal surfaces of the teeth will be more effectively cleansed, the gums kept from receding as well as receiving the beneficial stimulation of the massage. All the grooves and fissures on the buccal, lingual and labial surfaces of the teeth run from gingiva to the occlusal surface so they are better cleaned this way than by the cross brushing.

The space between the buccal surface of the third molar and the cheek is very small so that a brush as above described is more effective than one with a tuft of long bristles on the end. This style is also more effective in reaching the lingual surfaces. The handle should curve back.

After thorough brushing the use of the dental floss carried between the teeth and against the approximal surfaces completes the mechanical cleaning of the teeth.

# THE SURGICAL CORRECTION OF CERTAIN TYPES OF HARE-LIP AND CLEFT PALATE, WITH REPORT OF CASES

BY M. N. FEDERSPIEL, B.S., D.D.S., M.D.,

Professor of Orthodontics and Oral Surgery, Dental Dept., Marquette University, Milwaukee, Wisconsin.

## HARE-LIP

HARE-LIP is a congenital deformity of the upper lip characterized by a cleft varying in size and location, sometimes complicated with a continuation of a cleft in the floor of the nose, alveolar process, and palate. The name hare-lip is misleading as it does not resemble the cleft of the hare's lip. The cleft of the upper lip of the animal is in the median line which bifurcates to reach each nostril. In the human being the cleft may involve any part of the lip. Cleft of the lip in the human being may exist as a mere notch either unilateral or bilateral in the vermillion border. In some cases the cleft travels backward through the alveolar process and sometimes there is a complete fissure extending through the hard and soft palates. These various deformities differ in individuals. The writer has been unable to obtain any statistics concerning the proportion in which these conditions exist.

## CLEFT PALATE

Cleft palate is a congenital deformity characterized by a cleft involving a part or all of the hard and soft palate. Like hare-lip the extent of the defect varies in different subjects. In the more severe forms of cleft palate the cleft extends from the tip of the uvula to the anterior palatine canal. This fissure bifurcates then to communicate with a double alveolar cleft permitting the forward displacement of the central portions of the intermaxilla or osincisivum. German writers usually call this form of deformity "wolfsrachen" or wolf's jaw. When the vomer comes well down and is quite prominent it gives the appearance of a double cleft of the palate but this is not so in reality. Frequently the vomer is attached to one of the margins of the cleft. Associated with this condition is a unilateral alveolar cleft. Strange as it may seem the attachment always occurs on the opposite side of the alveolar fissure. Sometimes we find a cleft involving the hard and soft palate, leaving only the anterior alveolar process and lip normal, or the clefts may be still more limited, involving only a portion of the hard palate and velum and sometimes a mere bifurcation of the uvula. The variation of cleft palate and the degree of the cleft is of such frequent occurrence that it would require considerable space to give an accurate description of each defect that comes under the writer's observation in literature and practice.

### ETIOLOGY

A careful review, in medical and dental periodicals, of the etiology of cleft palate and hare-lip, will give the reader little information for determining possible factors in the exact cause.

Hypotheses and theories have been advanced time and again, only to be ridiculed by later writers.

On one occasion, not having been fully informed along the embryological lines pertaining to the development of the oronasal area, and being an ardent believer in the theory of maternal impressions, I contributed to the "*Items of Interest*" an article entitled, "Maternal Psychism—Its Effect Upon Dentition."

Since writing this paper my conclusions on the subject of psychism in its relation to fœtal life have become somewhat modified. Study and research work upon the etiology of cleft palate and hare-lip have convinced me that maternal impressions cannot produce cleft of the palate after the ninth week of fœtal development. Notwithstanding the foregoing conclusions I am still of the opinion that further research and study upon the subject of heredity may affect or in any part change the opinion of scientific men.

Heredity as a factor in producing cleft of the palate and hare-lip is today accepted by most men.

Dr. Guthrie Caley, Earling, B. C., gives the following chart:

<table>
<tr><td colspan="5">Parents, Normal</td></tr>
<tr><td colspan="2">John, Hare-lip</td><td colspan="2">Daughter, Normal</td><td>Nine other children</td></tr>
<tr><td>Daughter, Normal</td><td colspan="2">Son, Hare-lip and Cleft palate</td><td>Child, Hare-lip</td><td>Four other children</td></tr>
<tr><td>Harriett Edith<br>Cleft palate</td><td>Ellen Ethel<br>Cleft palate</td><td>Thomas</td><td>Henry<br>Cleft palate</td><td>Emily<br>Cleft palate</td></tr>
</table>

T. W. Brophy says, "Congenital cleft palate has a predisposing and an exciting cause. The predisposing cause is heredity. The exciting cause is mechanical, the application of force in embryo. I have little faith in the theory that prenatal impressions cause failure of union of the bones in question. In the greater number of cases in which this cause has been given, on inquiring it has been found that the mental shock occurred subsequent to the time, when, if physiological processes were not interfered with, union of the bones would be complete. It is too apparent to require argument that a mental impression could not separate a suture. Prenatal impressions possibly may be a factor in causing failure of union, but we have no authentic evidence to that effect. I believe, however, that defective nutrition, or general debility of the mother during the early months of gestation from any cause, may delay union of the palatine plates. Nature does not fail to develop the necessary bone and soft parts to form a normal palate, but it does fail to bring the parts into apposition and unite them.

The bones having failed to unite prior to the fifth month of intrauterine life, the mandible, as soon as the muscles of mastication become active, brings pressure of the palato-alveolar inclined planes of ununited superior maxillary bones, and acting as a wedge, forces them apart and widens the breach. Moreover, the pressure of the tongue and the flexed position of the head with the symphsis of the mandible, resting on the sternum, may contribute to some extent to the force which is exerted by the lower jaw on the palatal arch and which forces the bones apart.''

In my own practice I always attempt, by various ways and means, to discover some factor that might throw light upon the exact cause which produced the deformity. It is not uncommon to have a mother tell me that she was frightened by seeing something resembling the defect in her infant. This no doubt was imaginary, and cannot be considered. Upon inquiry, I find the majority of cases that some relative of the infant has had some form of cleft. Some time ago I operated upon a sister and brother, each of whom had a cleft of the soft palate. In another family I operated upon an eleven-month-old child who had a hare-lip. Shortly after that time the mother gave birth to another child who had a complete cleft of the palate and a hare-lip. This child lived but a few weeks on account of not having received the proper nourishment.

Wm. Rose relates the following: ''Heredity is an undoubted factor in their reproduction and an investigation of the family history in many cases elicits a confirmation of such an idea. Thus, in two instances, in my own practice, I have been able to determine that the father, grandmother, and the great grandfather had all suffered from hare-lip to a greater or less extent. Mason in his book mentions several other illustrations of this fact. Listen operated upon four members of one family for hare-lip. M. Demaquay relates a case in the Surgical Society of Paris, in which, from the great grandparents downward, eleven children had been born with hare-lip. In the British Medical Journal a correspondent relates his own family history, stating that it had occurred in some branch or other for the past hundred years.''

## TREATMENT

The treatment of cleft of the lip and palate is surgical. While an early operation is considered imperative, the surgeon must take into consideration the degree of deformity and the amount of vitality the patient has. Frequently I find patients possessed with a lowered vitality due to inherited weakness, or frequently to inability to receive nourishment properly, owing to the cleft of the lip and palate. The writer does not believe that a set of fast rules can be laid down as to the time of operation, but he believes that it is for the surgeon to carefully weigh and consider whether the infant has sufficient vitality and resistance to withstand the shock of the operation or any complications that might arise.

I always prefer to operate on patients having a hare-lip within a few weeks after birth. However, if those patients have a cleft involving the lip, alveolar process and palate, I prefer to close the alveolar cleft first, within ten weeks after birth, preferably. After the fissure in the mouth is closed, I then correct, surgically, the cleft of the lip. Owing to the fact that the tissues of the soft palate are not very strong at this time, I defer performing the operation for the cleft of the soft palate until the patient is at least eighteen months of age. My clinical experience has proven to my satisfaction that if patients are possessed of a sufficient amount of resistance and vitality to warrant an operation, the best results can be obtained in remedying these defects at an early period. Strange as it may seem the laity as well as many of the practitioners seem to labor under the impression that these defects should not be operated upon until the child is at least three or four years of age, or older. Others believe and recommend closing the cleft of the palate when the patient ceases to be an infant. Such practice and advice have a tendency to make the oral surgeon's work more complicated and laborious. The method which I employ in operating for the surgical correction of hare-lip I will endeavor to describe briefly. After the patient is anaesthetized, in order to determine the necessary amount of tension, I carefully take hold of the vermillion border of each side of the cleft with tissue forceps and draw the labial flaps together. This procedure enables me to determine the size of the incision necessary for freeing the lips and cheeks from their bony attachment. The loosening of the tissue is best accomplished by making a small incision into the mucous membrane of the buccal alveolar fold in the region of the canine fossa, then by using a flat blunt instrument, I carefully loosen the flaps. This procedure obviates the profuse hemorrhage that would occur by cutting and loosening the flaps with a sharp knife. The bleeding of course is at times quite severe but it can be readily controlled with hot sponge gauze being packed against the bleeding surfaces. When the coronary arteries are cut, they spurt considerably, but, although the bleeding can be easily controlled by hemostatic forceps, I prefer using a pair of clamps which I have devised. These clamps when properly fitted shut off the circulation so that the work can be quickly and easily done.

After the flaps are sufficiently loosened so that the sides of the cleft can be approximated without tension, I proceed to plan the incisions for obtaining the raw edges. Many practitioners boldly cut away the mucous membrane from each side and suture the raw surfaces together. I cannot condemn too severely this procedure because it is wrong to waste valuable tissue, and the contraction of the scar will frequently form a notch at the termination of the vertical scar of the vermillion border. I have also known operators who believe that the formation of a notch may be avoided by making a circular incision on each side of the lip. This method I do not approve of, because there is too great a formation of excessive tissue at the lower end of the suture line. It is impossible to lay down any set rules which will govern the surgical correction of cleft of the lip, because there are no two individuals in whom the deformity is identical. By studying the degree of the deformity several days before operating I am able to restore the lip to a correct anatomical shape. It is, of course, well to remind the reader that in repairing a hare-lip the restoration of the nostril and ala, and the proper shaping of the vermillion border are the important factors to be considered. Ideal results can only be obtained in mastering the technic and using good judgment as to when and how to manipulate the knife so that such deformities will be corrected along anatomical lines.

The suture materials which I use for coaptating are fine silk for the skin, and horse hair for the mucous membrane. Formerly I used to reinforce the coaptating suture by using silver wire in the form of mattress suture to overcome the tension of the muscular pull. This is rarely necessary now, since with a broad adhesive strip cut the shape of a dumb-bell it is possible to firmly immobilize the cheek and upper lip. While this method seems to be ideal in many respects, it has one drawback: it permits saliva or liquid food to creep under the dressing, thereby affording an excellent medium for the development of bacteria, thus producing infection, which may result in a ragged healed surface. This drawback, however, is easily overcome by cutting away the part of the adhesive strip lying over the wound, and connecting the remaining parts by passing a silk mattress suture through the ends and tying firmly, thereby reinforcing the wound sutures and permitting the cleansing of the wound. It is, of course, well to keep the wound covered by placing under the ligature a pad of sterile gauze or cotton.

## CLEFT OF THE PALATE

The surgical repair of congenital clefts of the palate and alveolar process, depends largely upon the degree of the deformity, the age of the patient, and whether the patient has sufficient vitality and resistance to withstand the shock of the operation or any complications which may arise. As I have said before it is impossible to lay down any hard and fast rules as a guide in the treatment of these cases. The best age, of course, is a few weeks after the birth of the child. The bones at this period are not fully calcified, and therefore can be easily brought together.

In the case of patients who are suffering from a double alveolar cleft, where the central portion of the intermaxilla is displaced forward and attached near to the tip of the nose, it will be necessary to perform a submucous operation and to resect a part of the nasal septum by removing a "V" shaped section. This will permit forcing the displaced alveoli backward so as to form a satisfactory alveolar arch. Sometimes it is only necessary to make a simple incision of the septum, and allowing the septum to overlap when the intermaxillary bone is forced into position. I have had the opportunity to see a large number of cases of single clefts where the alveolar on one side may be so out of line that it protrudes from the mouth, thus causing the face to be distorted. The treatment of these cases, by some operators, is to close the cleft by pressure at an age when the bones will yield, which is usually within six or eight weeks after birth. The method of treatment at the hands of the unexperienced will usually produce a complicated condition. By that I mean that there is a strong tendency for one side of the alveolar process to override the other, thereby producing a buckling condition of the anterior portion of the alveolar process. I admit that forcible contraction will close the cleft, but I have abandoned such procedure in cleft palate operations; for it is my intention (in operations for the closing of the cleft) to maintain always the shape of the dental arch. I always close the alveolar cleft first. This can be accomplished by forcible pressure, providing the patient is young enough so that the borders of the cleft will be placed in contact: but if I find it impossible to bend the protruding alveolar process I usually produce a green stick fracture, thereby preserving the shape of the arch. The bone is held in this new position by silver suture or other flexible wire, so placed that it will cause the least injury to the tooth germs. After firm bone union has taken place, I proceed to close the cleft of the hard and soft palates. The technic that I follow depends upon the condition of the remaining cleft. If I find that the cleft is narrow and the alveolar arch high, I usually prefer to strip the muco-periosteal flaps from the bony attachment. This is accomplished by cutting through the tissue along each side of the borders of the cleft, and then dissecting the flaps from the bone by periosteal elevators. It is, of course, also necessary to free the attachment of the tissues on the posterior border of the horizontal process of the palate where the membrane turns into the nasal surface. Usually such procedure is all that is necessary to obtain an approximation of the tissues. The edges of the flaps are then freshened by cutting off a narrow strip of the mucous membrane. Silver wires, twenty-eight gauge, are then passed through the flaps midway between the cleft edges and the lingual surface of the teeth. These wires are passed through silver plates or gutta-percha pads, then twisted, thus forcing the edges of the flaps together. Fine silk is used for coaptation sutures and the edges of the flaps are laced the entire length of the cleft.

This method is ideal; but occasionally the oral surgeon is confronted with conditions where it is impossible to bring the flaps together, under the technic outlined above, either on account of cicatricial tissue or an extremely wide cleft. Under such conditions I do not hesitate to follow the usual technic; but I overcome the difficulty of bringing the edges together by boldly making an incision in the bone on each side of the teeth, one-fourth of an inch from the lingual surfaces; then, by tying the wire ligature, it is an easy matter to bring the parts together. The relaxation wound soon fills in with granulations. I find very little difficulty in closing the soft palate if I get the flaps together in the hard palate. All that is necessary is to denude the edges of the cleft, using silk for coaptation sutures, reinforced by wire and plates.

## POST OPERATIVE TREATMENT

After the operation the patient should be put in bed in such a position that the saliva mixed with mucous and blood will trickle out of the mouth.

After six hours the nurse irrigates the nasal as well as the oral surface with normal salt solution. I usually advise the giving of a cathartic a few hours after the operation so as to produce thorough elimination. Usually after twenty-four hours the patient is comparatively comfortable. Liquid food is given just as soon as the patient can tolerate same.

### FAILURES AND SUCCESS

If the cleft has been closed without tension of the tissues or shutting off the blood stream, one can usually expect a fair union; but occasionally the area becomes septic, the temperature goes up, the tongue becomes coated, the breath is foul and the patient is restless. The line of suture is puffed and covered by a thick, slimy discharge, which spreads away from the center. Then, one by one, the stitches begin to slough out, and sometimes the entire suture line breaks down, thus causing a complete failure. Then again I have had cases where the infection involved only a part of the suture line, so that I obtained a partial success. For some time in the past, I advocated irrigating and spraying the mouth and nose with antiseptics, but now I have discontinued the use of antiseptics, and depend entirely on mechanical cleansing, with the use of warm, normal salt solution. I find the result eminently satisfactory.

It is remarkable how often a perforation remaining after a not entirely successful operation will sooner or later close itself. I know of a number of cases where infection prevented a complete union, leaving a small perforation, which would close after a season's time. Occasionally one must perform a subsequent operation to close a remaining small opening which nature fails to close.

### REPORT OF CASES.

Case 1. E. S., nine years old; excellent health; had congenital cleft of the lip, alveolar process, and hard and soft palate. (See Figs. 1-2-3-4-5). You will notice that the alveolar process is divided between the left central and the rudimentary left lateral. The alveolar process on the right side was turned outward and protruded to such an extent that it caused a distortion in that region. It was necessary to reconstruct the shape of the dental arch before doing anything further. The patient was anaesthetized under ether and an incision was made between the right deciduous cuspid and the right permanent lateral. The muco-periosteal flaps were raised and retracted. The exposed bone was cut one-half its thickness by a narrow long fissure bur, then by forcible pressure the protruding alveoli, containing the lateral and the two centrals, were brought in contact with the alveoli on the opposite side, thus producing a green stick fracture. The contact surface was then freshened and the alveoli bones brought together. Then in order to immobilize these parts into their normal positions, I slipped the alignment bar into the tubing on the bands which I had previously cemented on the posterior teeth, and ligated to the alignment wire all of the anterior teeth. The patient's mouth was kept as clean as possible, and four weeks later the appliance was removed, and bone union had taken place. This operation restored to a fair degree the shape of the dental arch, and as a result the cleft of the lip became more narrow. When I operated upon the patient a second time for the correction of this defect, I obtained better results than if I had attempted closing the lip before the shape of the dental arch had been restored. (See Figs. 1-2-3-4-5). The patient was instructed to report at my clinic after a summer's rest to have the hard and soft palates closed.

CASE 1.

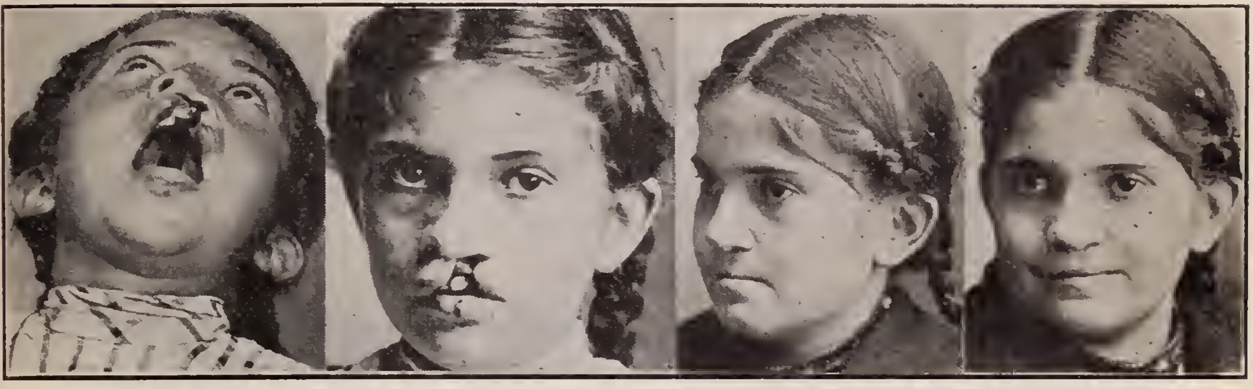

Fig. 1. Fig. 2. Fig. 3. Fig. 4.

FIGURE 1. Showing complete cleft and hare-lip before the operation.
FIGURE 2. Showing unilater cleft of the upper lip and floor of the nose.
FIGURE 3. Showing partial side view after the operation.
FIGURE 4. Showing front view after the operation.

Case 2. Patient, girl, M. W., aged seven years; American; had congenital cleft of the soft and one-half of the hard palate. Enunciation faulty. During my examination I was informed by her parents that two years previous an operation for this defect had been performed and resulted in a complete failure. Owing to the fact that a mass of scar tissue had formed, on account of the faulty technic of the first operation, and the elasticity of the tissue being gone, I was confident that the child would never be able to speak distinctly, after the cleft had been closed. The parents insisted upon the operation, notwithstanding the fact that I could give them but very little encouragement.

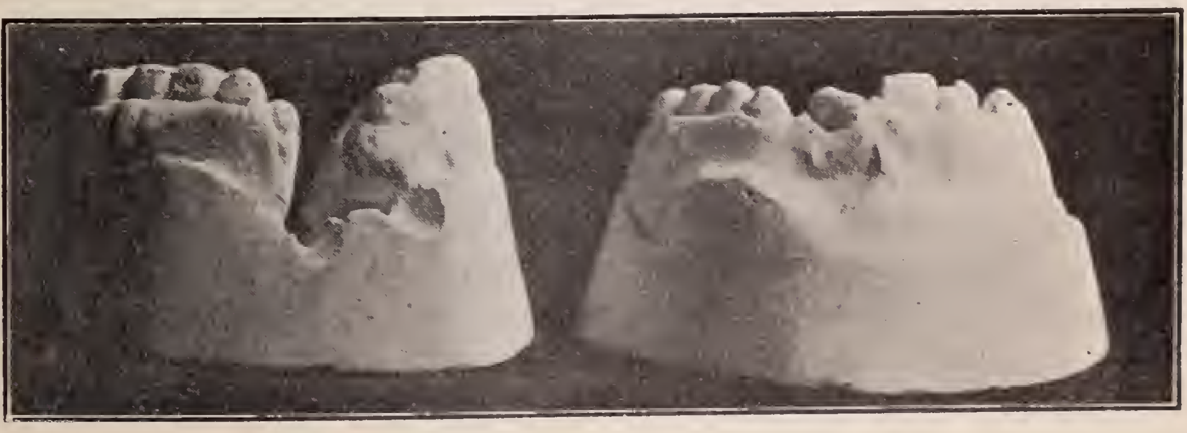

Fig. 5.

FIGURE 5. Showing the casts before and after the operation.

The operation was performed in the usual way and the patient was discharged within ten days after the cleft had been healed.

One year later the child, accompanied by her mother, paid me a visit, and, much to my astonishment, she spoke clearly and distinctly.

Case 3. F. Z., aged seven years; orphan, under care of the Children's Home Society of Milwaukee, reported at my clinic at Marquette University in October, 1910. The boy had a congenital cleft, involving all of the soft and one-half of the distal portion of the hard palate. Speech was very indistinct. One week later he was operated upon, under chloroform. Muco-periosteal flaps were raised from the hard palate. The borders of the cleft were denuded, and the entire cleft closed and held so by silk ligature, reinforced with silver plates and wire ligature. The patient was given the best of care possible after the operation; but notwithstanding the aseptic precaution during the post operative treatment, the young lad developed a virulent infection. So severe was this infection that the entire palate was one mass of tissue undergoing degeneration. The mouth was irrigated with diluted iodine solution, and on the sixth day following the operation the patient began to improve and the infection passed away rapidly. With the exception of an opening about one-half of an inch long and a quarter of an inch wide, the entire cleft was closed. Two weeks later I attempted to close this remaining cleft, but the patient took the anaesthetic so badly that I deferred operating, and instructed the Children's Home Society to have the boy report to me after a summer's rest.

CASE 4.

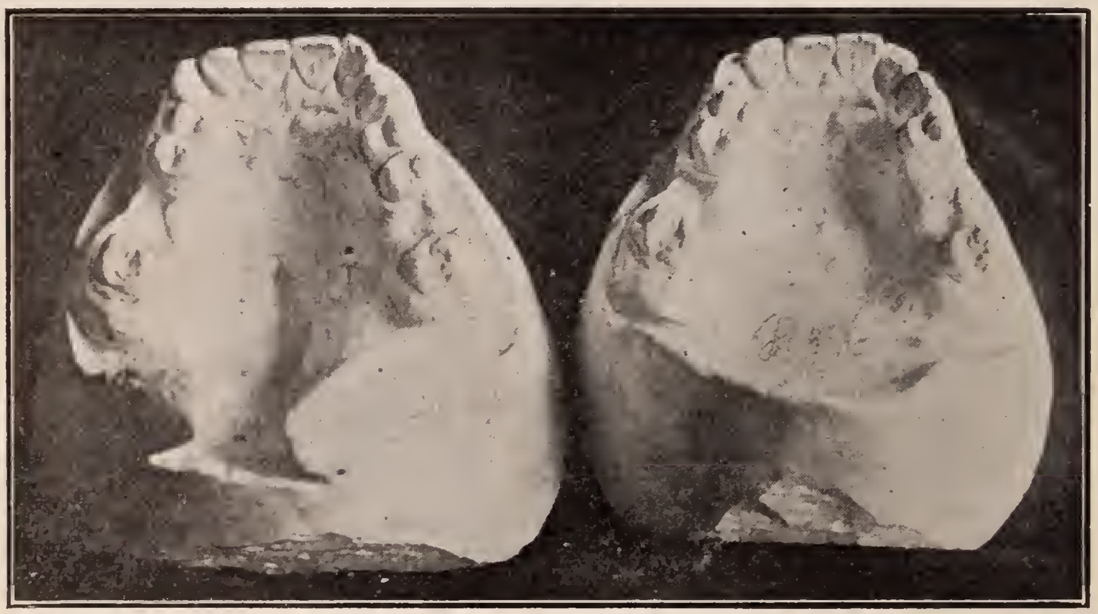

Fig. 6.

FIGURE 6. Showing palatal view of cleft of the soft palate and the result after the operation.

On November 16th the boy reported at my office for further examination, and I was astonished to find that the cleft had closed entirely (evidently by means of a contraction of the scar tissue). Nature, indeed, was kind to this boy, and I was glad to find him enunciating clearly.

Case 4. M. K., boy, aged fourteen years; nationality, German-Polish; diagnosis: congenital cleft of the soft palate. Referred to my clinic at Marquette University by a medical inspector of the Milwaukee District Schools. The patient was operated upon November 13th, 1911, under chloroform anaesthesia. The borders of the cleft were denuded and ligated with silk, and reinforced by silver plates and wire ligature.

The patient was kept exceedingly quiet, and the wound irrigated every three hours with warm saline solution. Healing took place very rapidly, and the patient was discharged from the hospital November 17th, with instructions to report daily, so that the mouth could be irrigated. On November 22nd (the cure having been effected), I removed the ligature and discharged the patient. (See Fig. 6).

Case 5. (Figs. 7-8). Patient, Mr. E. G., age, eighteen years; had congenital cleft of the hard and soft palates. He had been operated upon two times with partial success, but there still remained an opening in the center of the hard and soft palates about one and one-half inches long and three-fourths of an inch wide. There was considerable scar tissue, and for that reason I hesitated informing the patient of a favorable prognosis. After some consideration, I decided to strip the greater part of the surrounding tissue away from the bone and also cutting the attachment which turns where it continues with the membrane covering the floor of the nose. This was done under ether anaesthesia. I then found that with the removal of considerable scar tissue there was plenty of flap for approximating. The parts were held together with fine silver wire. After the sixth day the stitches were removed and the cleft completely closed.

CASE 5.

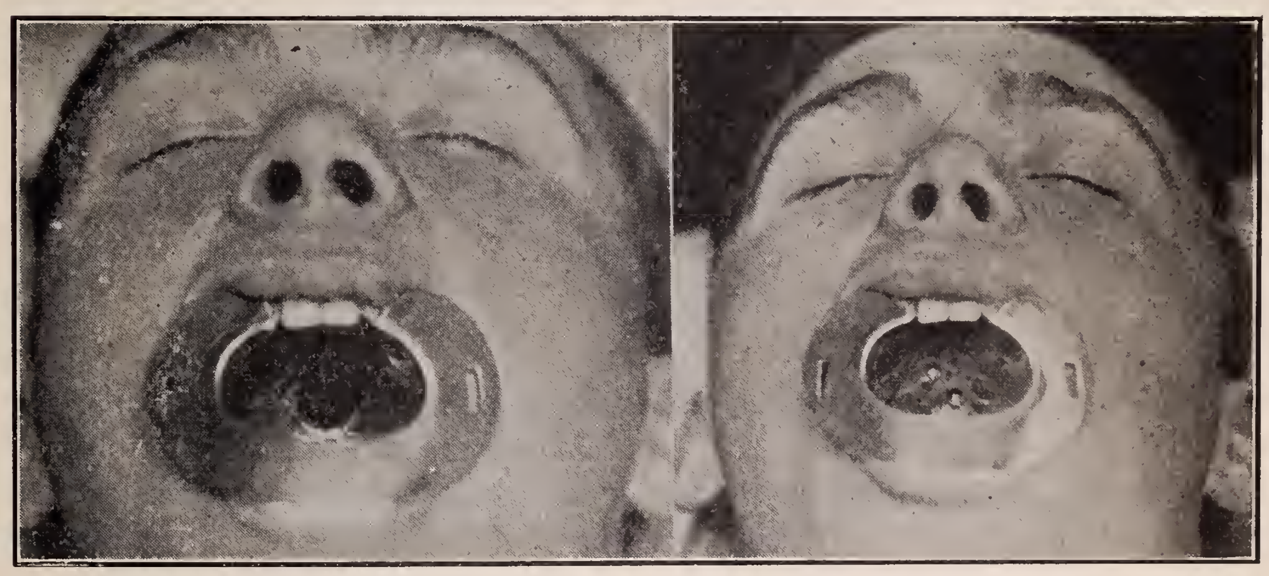

Fig. 7. Fig. 8.

FIGURE 7. Showing opening in palate after the patient had been operated on twice, there being considerable scar tissue which had to be removed.

FIGURE 8. Showing the same case after the palate was closed.

Case 6. (Fig. 9). Infant boy, six weeks old, had complete cleft of the soft and hard palate, alveolar process and upper lip. The gap was very wide and the alveolar process on the right side protruded away from the medial line, making the deformity appear very pronounced. The child was quite emaciated on account of not being able to partake of food properly. The parents of the child, fearing that it was impossible for the child to live much longer in the condition in which it now was, urged an immediate operation. In this case I felt that it was better to close the anterior portion of the cleft and lip in one operation. This was done by bending the alveoli so that it approximated and held so by silver wire.

CASE 6.

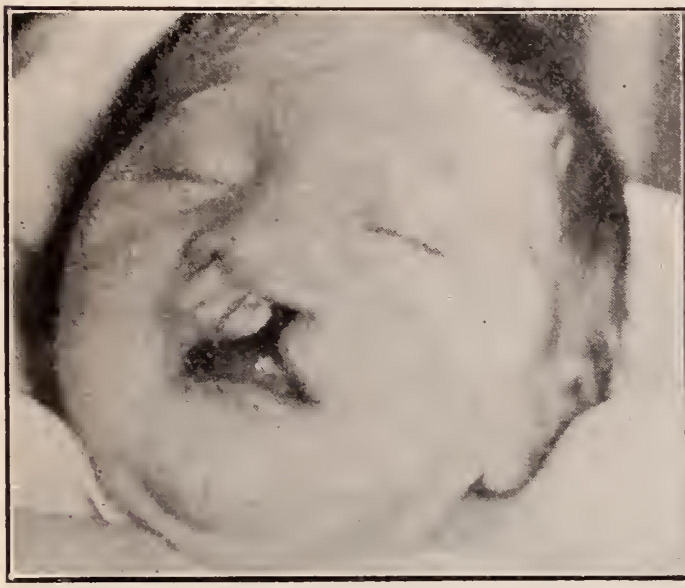

Fig. 9.

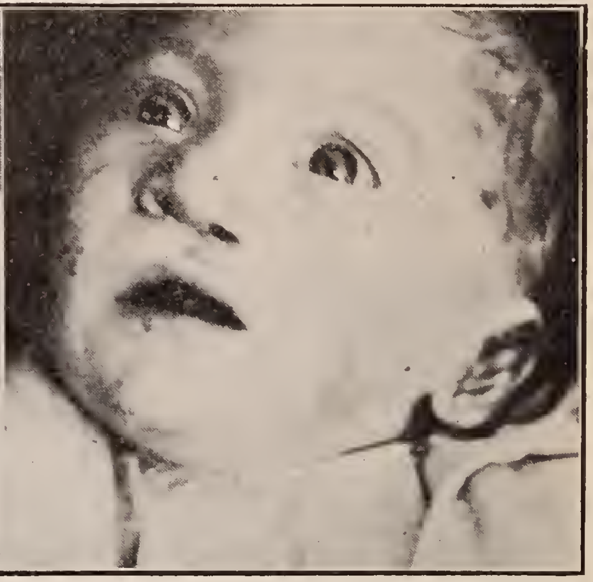

Fig. 10.

FIGURE 9. Showing complete cleft of the soft and hard palate, alveolar process and upper lip.

FIGURE 10. Showing same patient after operation, the ala of the nose still seems to have a flattened appearance, which will be remedied at some future time.

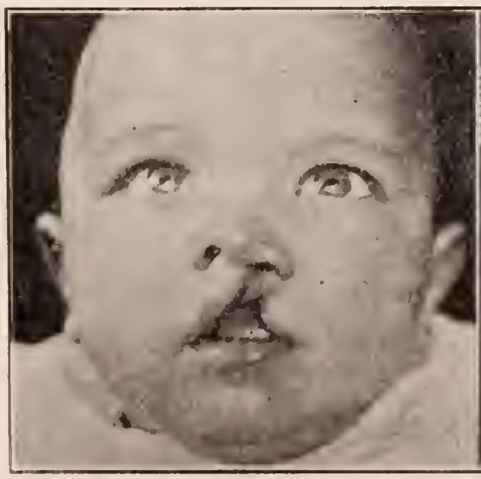

Fig. 11.

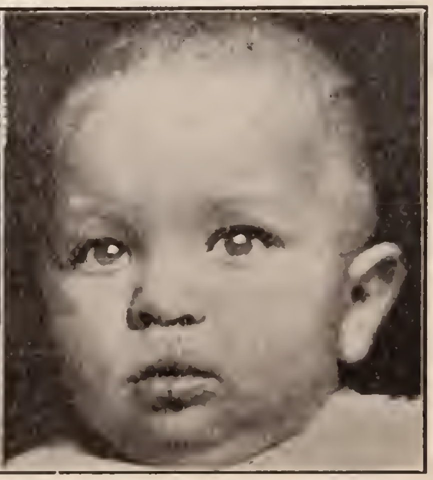

Fig. 12.

FIGURE 11. Showing large cleft in the upper lip.

FIGURE 12. Same child seven months after the operation.

gauge twenty-two. The lip was closed in the usual way. You will notice in Fig. 10 that the child has gained in weight, although only six weeks have elapsed since the operation. Since that time I have closed the remaining portion of the cleft and the child is doing nicely. It will be necessary at some future time to adjust the ala of the nose, which still seems to have a flattened appearance.

Case 7. (Fig. 11). Infant boy, had a large cleft of the lip extending to the floor of the nose. This case was operated upon under ether anaesthesia. In this case it was necessary to free the tissue quite extensively from the bone so that the border of the cleft could be approximated without any tension. Fig. 12 shows the result eight months after the operation. The function of the lip is restored as well as the anatomical shape.

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# SOME SUGGESTIONS IN ORTHODONTIA.

BY F. E. WILLIAMS, D.D.S., LOS ANGELES, CAL.

UPON STARTING the practice of orthodontia, in 1905, I pursued the usual method in vogue then, using the Angle anchor band to anchor the arches and the band and spur for the turning movement required in the correction of malocclusion. Since then I have made some changes in the bands, which I believe makes the better tooth movement, without altering the principles of this method of correction. It is my purpose here, in short form, to discuss these changes which I have found an improvement in my practice of orthodontia during the four years I have used them, and a decided improvement upon the old methods.

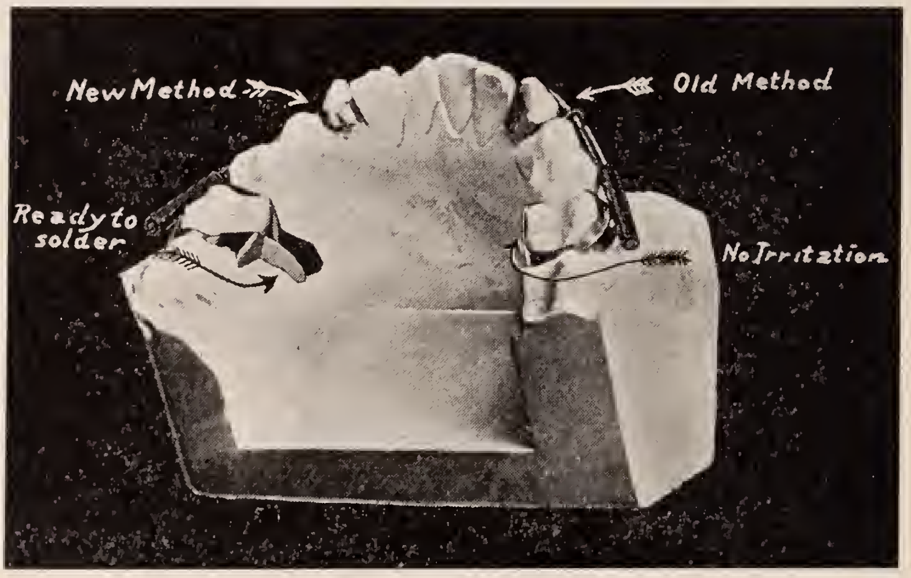
All are familiar with the Angle anchor band, with the nut and threaded bar on the lingual surface of the teeth, protruding into the mouth at least as far as the diameter of the nut, and I have seen the nut and bar in many cases stand at an angle in the mouth of from ten to thirty degrees. The cuts of the cases one sees in print are quite clever, but in the actual cases it has not been my pleasure to see a like result. Also, in the cases in print the tongue is not represented, which is a very thoughtful as well as necessary omission. Likewise, it would seem the results would hardly justify the method.

My patients objected to the anchor band, and spur and band. And why should they not? I told them the usual coined phrase, that "the tongue would be a little sore, but it would soon be well and they would hardly notice it." Would that persuade us to have it in our mouths? No, never. They put up with it as a fact, but only because it seemed to them they must do so in order to have their teeth corrected at all, or from parental persuasion.

One day it was necessary to put a band on a protruding tooth where the irregularity was so great it was impossible to use the regular Angle band, and I had to make a plain band. The patient was so pleased that the band was smooth, with nothing to hurt the tongue, while on the other side the regular band was a monstrosity in comparison, and the comparison showed me the difference so clearly that I unscrewed the nut, took off the Angle band and put on a smooth one. To this day I have never since used one of the Angle forms of anchor bands, and am sure a patient or parent would never consent to have one in the mouth if he was given a choice, and I believe when I used the old form of band I put them on quite as well as the average, at least.

The accompanying illustration will convey a clear idea of the band I use now, and the chance for adjustment is all that can be desired.

On one side the form band is placed in position, on the other side the band has been pinched, soldered and dressed down. One band is ready to put on the tooth, as is usual with any band. After it is pressed into place the ends are pinched together in the center of the tooth and soldered. The band now fits the tooth exactly, any extra width may be trimmed up and the ends of the band cut off close to the band body and polished down smooth, leaving a light swelling or thickness where it is soldered, which may be polished as thin as desired. I make the edge of the band next to the gums concave by placing a small diameter stone against it, which gives me a chance to press the edges up tight to the tooth before the cement is set.



To remove the band, place one end of forceps under edge of band and the other against tooth with rubber between. A gentle pressure will loosen it. There is little chance of injuring a tooth in the removal of band, and no nuts get loose or threaded bar to add to the irritation of the tongue. There is nothing whatever to collect and retain food products, as the nut and bar always does, consequently there is no irritated gum margins and consequent recession. In comparison, it is a comfort to the patient and is as quick to handle as the old form band, and the angle of the buccal tube is readily changed without resoldering the same.

The Angle spur and band I discontinued to use for the same reason as the anchor band; for to make the spur as short as it could be used with a slight notch to help retain the ligature wire, it was always more or less irritating to the patient. Wrapping the wire once around the spur helped retain it, but many times the wire would work off after tooth movement before the patient would come again. Still it was too much of a projection and made the tongue sore from the movement in talking, speaking, eating, etc.

In the elimination of the spur, after I soldered the band I cut the seam off about one-eighth of an inch long and made a slit in seam along its length up to the band, about one-sixteenth of an inch from the edge. This small part I turned down to the band and again soldered, making a hole just sufficiently large to pass the ligature wire through. This was an improvement with the spur eliminated, and it was quicker than making it the old way, though it was hardly satisfactory, as it was still too much of a projection on the inside. Some time later I found that after I soldered the band, if I took a real small drill and made a hole through the seam next to and nearly through the band, I could dress it down almost smooth, so that there was little projection into the mouth at all and no irritation of the tongue; no soreness. The holes I can put anywhere along the seam the movement requires. My wires never come off, the time required boring and making the band is at least one-half less. The cuts below will show the two bands. To the patient I believe I have rendered a real service and given them comfort where before they had little or none.

## THE MAXILLARY ANTRUM*

BY R. F. HARRELL, M.D., ALEXANDRIA, LA.

IN THE SELECTION of this subject, I was actuated by the fact that this is the common playground of the dentist and rhinologist.

On account of the meager provision for the natural drainage of this cavity, some of the most astute minds have pondered over its mechanical construction, some thinking if they had had their part in its construction they would thereby had ridden to fame in thus helping out the ills of humanity. And all agree that "man is fearfully and wonderfully made." The duct leading from this cavity to the nose is the only drainage it has, and in most cases we find the floor of this cavity nearly a half inch below that of the nose. Yet we read in Holy Writ that the builder of this universe, when He had completed all creation, including man, "saw every thing that He had made and, behold! it was very good." In the face of these facts, we are to conclude that there is no dilemma into which we may be plunged, but there is a way of escape if we only delve into its fathoms and solve its mysteries. So, I believe there will yet be some better way to deal with this cavity than has hitherto been devised, if we only persevere in the study of its intricacies.

Vaselius (1515) described the maxillary sinus, as well as the frontal and sphenoid sinuses, and asserted that they contained air. From his time until the period of activity of Schneider (1616) various opinions were held about the antrum, some writers believing that it contained air; others that it produced mucus, and some that it was intended as a resonator for the voice. Nathaniel Highmore, in 1783, described this sinus, which, since that time, has borne his name, the maxillary sinus today being known as the antrum of Highmore. He published a history of a case of suppurative disease of this cavity. More recently diseases of this cavity have received some attention from the hands of the dental fraternity, but these interesting cases are now turned into the field of nasal surgery, where they properly belong.

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*Read before the Louisiana State Dental Society, 1912.

The antrum of Highmore is present in the newly born infant as a long slit-like cavity. It very rapidly increases in size and at the end of the first dentition measures about a cubic centimeter. In adult life it is the largest of the accessory cavities of the nose.

The antrum of Highmore is a pyramidal cavity, lying entirely within the superior maxillary bone. On each side the base of the sinus corresponds to the external nasal wall and lies partly opposite the inferior meatus and partly opposite the middle meatus of the nose.

The base is crossed about the middle by the inferior turbinate body, so that if a cadaver specimen is held with the light on its nasal side, the investigator, looking into the antrum, the base or inner wall of the antrum will show a light spot at its lower part, corresponding to the inferior meatus of the nose; above this is seen a shadow cast by the inferior turbinate body as it crosses this wall, while above the shadow another luminous spot will be seen, which marks the point of the antrum lying opposite the middle meatus of the nose. The apex of the antrum is directed outward towards the malar bone and generally extends as far as the articulation of this bone with the superior maxillary bone. But it is not my intention to go into an extensive description of the anatomy of the antrum in this paper. I will only add that there is no uniformity of relation in the floor of the antrum to the floor of the nostril, as in some cases we find the floor of the antrum above that of the nostril, but in the majority of cases the floor of the antrum is decidedly below that of the nostril, making drainage from the antrum to the nostril somewhat difficult. The floor of the antrum is bounded by the alveolar ridge; the alveolar ridge contains the roots of the teeth. If specimens are examined a variation will be found in the relation of certain teeth to the floor of the antrum. The incisors and the canine teeth, and the first bicuspid, will have no relation with the antrum floor, but the second bicuspid and first molar will be found to have an intimate relation with the floor of the antrum. Some times the second molar will also have an intimate relation with the posterior part of the antrum. Usually the roots of the second bicuspid and the first molar will be found approaching the floor of the antrum and separated from it only by a thin partition of the cancellous bone of the alveolar process. In such a case the periosteum of the root of the tooth will be separated from the mucous membrane of the antrum by the cancellous bony partition and the periosteum of the antrum floor. In other cases the roots of the second bicuspid and first molar will project into the floor of the antrum in such a way as to indent this floor and make a decided protuberance in the floor of the antrum. In such cases, the root of the tooth will be separated from the mucous membrane of the antrum only by the thin lamina of compact bone, which forms the floor of the antrum. In still other cases the roots of the second bicuspid and first molar will perforate this lamina of bone and project through the antrum floor into the antral cavity. In such cases the root of the tooth lies in direct contact with the mucous membrane of the antrum. (See cut).

From the study of the relation of the teeth to the antrum, it will be seen plainly that the antrum can best be reached through the root cavity of the second bicuspid.

The antrum of Highmore is subject to a variety of diseases, including acute and chronic inflammations, what is known as dental, and other cysts, polypi and other tumors, benign and malignant. The benign tumors are papilloma, fibroma, angeoma and osteoma. Malignant tumors are sarcomata and carcinomata. It is impossible in a paper like this to go into descriptive details of all these maladies, but the purpose of this paper is to deal with the various methods of operative procedure upon the antrum of Highmore. Before describing these methods, however, it is well to take up some of the causes of acute and chronic inflammations of this sinus.

The acute inflammations often accompany acute rhinitis and influenza. The acute infectious diseases—pneumonia, typhoid fever, measles, scarlet fever, diphtheria and smallpox—often give rise to acute inflammation of the antrum. Inflammatory disturbances in the neighborhood of the maxillary sinus often give rise to an involvement of the sinus by extension. This is especially the case in disease of the teeth of the upper jaw. Decay opens the pulp cavity, clearing the way for infectious germs to follow the root canals to the periosteal lining of the socket of the root of the tooth. Here an abscess may form around the root of the tooth, and if the lamella of bone separating it from the cavity of the antrum be thin, or as in some cases, even wanting, infectious material may readily penetrate into the sinus and set up acute inflammation. It is not necessary for pus to enter the antrum every time, but the septic inflammation may travel through the bone, which becomes inflamed as a sequel to the periostitis. In this way a tooth whose socket is not situated under the antrum—as, for instance, an incisor tooth—may excite empyema by causing osteitis of the alveolar process. Diseases of the roots of the first and second molars is most liable to give rise to sinusitis, as the bony covering between them and the sinus is apt to be thinner than in other places. In children the germs of the second teeth separate the bottom of the antrum widely from the teeth of the first set until second dentition, and up to this period empyema of the antrum is practically unknown. Root abscesses are generally accompanied by absorption of the bone about them, a process which favors penetration of infectious material of the tissues separating them from the antrum. Dental cysts forming at the roots of teeth may suppurate and burst into the sinus, causing empyema. In extracting teeth injury has been done to the bony partition between the root socket and the floor of the antrum, especially if the tooth has been crowded towards the antrum in order to get a firm hold. In this way an opening has been established between the oral cavity and the antrum.

We now come to the operative methods usually adopted in the treatment of this cavity.

The surgical treatment of the maxillary sinus may be either conservative or radical. The conservative method consists of washing out the antrum through the normal opening, or by puncture. The radical, or operative procedure may be described as first, an operation through the alveolar process; second, through the anterior wall or canine ossa; third, through the inferior meatus; fourth, what is known as the Caldwell-Luc operation.

The sinus can be irrigated very easily by means of a sharply curved trocar and canula, which has an irrigator attached. The outer wall of the nose is subjected to a four per cent. solution of cocain by saturating a piece of cotton and inserting it between the lower turbinate and the outer wall of the nose, letting it remain about ten minutes. With the point of the trocar placed one inch back of the anterior tip of the lower turbinate and against the outer wall of the nostril, quick pressure is made against the trocar in an upward and outward direction, which usually sends the point into the sinus. The trocar is now removed and an ordinary Davidson syringe attached by means of the irrigator, and the sinus irrigated with a boric acid or formalin solution. The patient's head is held well forward to facilitate the escape of the fluid through the anterior nares. This procedure is used for diagnostic purposes; also in mild acute cases a few washings of this kind often result in a cure.

The alveolar operation—to enter the antrum in this operation, the root cavities of the second bicuspid or first molar teeth are chosen. If the teeth are present one is withdrawn. If the teeth are absent a crucial incision is made over the inferior surface of the alveolar process, and a periosteotome is used to separate the alveolar mucous membrane and the periosteum from the bony process. When the alveolar process is exposed, either a hand drill or a dental drill is used to perforate through the alveolar process into the sinus. In every case the end of the drill must point towards the supra-orbital nerve. This is an important rule, for a slight deflection toward the median line may send the drill into the nose, and an equally slight deflection externally will send it into the muscles of the cheek. The cavity can now be curretted and washed out, and packed with gauze. The cavity should be dressed about every third day. The packing should be removed and the antrum washed out with a saline, or boric acid solution.

Second, comes the operation through the canine fossa. This is done by making an incision at the junction of the buccal with the alveolar mucous membrane, extending from the median line, posterior to the lower edge of the malar prominence. The periosteum should be raised in both directions, a small chisel should now be used to penetrate the antrum about one-eighth of an inch in front of the malar ridge. Then with Rongur forceps the whole of the front wall of the antrum can be quickly removed, exposing the entire cavity of the antrum. This gives an excellent opportunity of inspecting and curretting the whole antrum. After the antrum is thoroughly cleansed, and hemorrhage stopped, the antrum may be packed with gauze and treated through this opening till it heals.

Third: The antrum is sometimes opened through the inferior meatus. In order to gain free access to the meatus, a large portion of the anterior end of the lower turbinate is removed, so as to afford a view of the inferior meatus. The lachrymal canal should be located with a probe, and a chisel placed just behind this opening, when a few sharp strokes with a mallet will send the chisel into the antrum. After the antrum has been penetrated, the chiseling is continued till an oval piece of bone has been removed, or loosened, and then removed with some cutting instrument. I have seen openings in this locality made with large burs propelled with the dental engine, but this, to my way of thinking, is a very unscientific operation, as it tears the tissues and leaves a very ragged opening.

Fourth: The Caldwell-Luc operation is perhaps the best operation in old chronic cases of empyema. This operation consists of removing the anterior wall, as has just been described, clearing the antrum of all diseased material, and with the finger in contact with the nasal side of the naso-antral wall, place a small chisel against the antral wall just behind the bony wall of the lachrymal canal, which lies in the front of the antrum, separate the bony partition anteriorally, posteriorally and above by light strokes with the mallet; separate the mucous membrane from the loosened bone, remove bone, and after releasing the membrane on the same lines as have been made for the removal of the bone, press the membrane from the nasal cavity into the antrum, smoothing it out nicely over the floor of the antrum, where it will serve to furnish a large portion of that cavity with new, healthy membrane after it has been curetted.

This is an ideal operation for chronic cases, and has the advantage of turning the drainage into the nose instead of the mouth, as the opening in the canine fossa is closed at once and all drainage goes on through the large opening thus made between the nasal cavity and the antrum.

# OBITUARY

## Dr. William H. Upjohn

Dr. Wm. H. Upjohn, a leading dentist of Lafayette, Ind., and formerly a resident of Brookston, met his death Sunday evening from being run over by his own automobile. With his wife and daughter and his wife's uncle, Robert Friel, he had just returned from Rensselaer and Monon, and the party had stopped at a restaurant for supper. After supper his wife was going to drive to the Soldiers' Home with her uncle. The machine "choked," and Dr. Upjohn stepped in front of it to crank it, not knowing that it was in gear. The car started suddenly, doubling him up under it and breaking his neck. His wife stopped the machine and sprang out, spraining her ankle and otherwise hurting herself as she fell. She was taken in a hysterical condition to the St. Elizabeth hospital with her husband. An examination soon revealed the fact that the doctor's spinal cord was severed and that his condition was hopeless. He died at 8:40 Monday morning.

Dr. Upjohn was born near Greensburg, Ind., March 25, 1865, and his father, Thomas Upjohn, is still living with a daughter at Lincoln. Dr. Upjohn was a graduate of the Indiana Dental College at Indianapolis and two years ago was chairman of the committee on ethics of the Indiana State Dental Society. He is survived by his widow and an adopted daughter, Eleanor Upjohn. He had been engaged at his profession in Lafayette for twenty years.

## LOYAL

Sister Kittie's home from college with a host of modern kinks
In the way of hygienics, sanitation, food and drinks.
Proteids and carbohydrates she combines exactly right,
For the strictly balanced ration she identifies at sight.
She knows all about digestion, what is best for us to eat,
What we need for body-building, growth and force, repair and heat;
And the dinner table's lovely when my sister has it set;
But we haven't lost our confidence in Mother's cooking yet!

—*Lippincott's.*

# THE DENTAL SUMMARY

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# REGULAR CONTRIBUTIONS

## A NEW METHOD FOR MAKING GOLD INLAYS WITHOUT CASTING.

BY W. C. DALBEY, A.M., D.D.S., DUQUOIN, ILL.

I HAVE TWO CASTING MACHINES. One of the makes I believe to be the best on the market, but I have laid them aside. I believe I have a better and quicker way to make gold inlays. The new way never fails. I do not have to wait for plaster to set, dry out, or to heat up. Neither is there any worrying as to what the outcome will be--whether I have enough gold, or will there be any nodules, or warping, or shrinking, or expanding? or, is the flask hot enough? or is it cold enough? etc., and my heart goes pit-a-pat till the patient leaves the price in my hand—-and a dozen and one things that have made the cast inlay a sort of conundrum. I do not decry the large cast inlays. I have made them for years and have obtained beautiful results. The gold inlay has come to stay. But it is the smaller inlays that take practically the same time to make as do the larger ones that I wish to give a new method for making and which I believe is a quicker and better way.

Take two pieces of brass (iron will do), one piece one quarter of an inch thick by one inch wide and two inches long. The other piece the same dimensions, but one-half inch thick. In the quarter-inch piece drill three holes, equidistant, 1-4, 5-16 and 3-8. In the thicker piece drill three holes, 7-16, 1-2 and 9-16. Have your machinist put his tapered reamer in all of these holes just enough to taper them. These are your flasks or mould holders. You may not have much use for the thicker block, as it will hold quite larger inlays, so you had better try out the thinner one only, if the scheme appeals to you.

Now, take your pattern in wax the same as for a cast inlay. Insert your sprue wire to facilitate handling only. Or, you can use modeling compound. Take a good quality of quick-setting cement and mix it fairly thick, fill the hole, having first oiled it, in the brass piece that will best fit your wax model, big end of hole up, with your cement of a sticky consistency. Now, souse your model in and out of the cement several times, until every part of your wax is covered except that side containing the sprue wire. Leave this side all exposed. Now, settle wax model to place.

By the time it takes to tell it, your cement will have hardened. You now may pick out most of the wax, a little heat with mould turned downward will do the rest. Wipe dry. Now, take any of the fiber or mass golds and fill and work down as hard as you please. Always keep gold between your instrument and margin of your mould. There is no limit, practically, to the density to which you may make your inlay. Invert your flask, drive out your cement plug containing your inlay. Crack it open with a heavy knife-edged instrument. Or, you may heat the cement red hot and dip in water. The cement will break more easily.

To facilitate the breaking, you may take your moulds and cut two slots in the opposite sides of the holes with a hack-saw and insert thin pieces of brass into the slots and solder them in place, allowing the pieces to project into the holes slightly. These pieces will make grooves in your cement plugs which will allow of your breaking them readily. And it isn't patented.

> It is grip and grit that conquer success; not alone the vigor with which one takes hold of his task, but also the doggedness with which he holds on after he has taken hold.
>
> It takes courage to work on in silence, and wait, perhaps, until you are dead for the justification of your acts which nobody understands and which you cannot explain without injuring another.
>
> —*Kemble.*

# TREATMENT AND FILLING OF ROOT CANALS*

BY I. M. SAUM, D.D.S., CLEVELAND, OHIO

THE SUBJECT OF ROOT CANALS and treatment thereof is so old and one upon which there has been so much said that I feel rather reticent in presenting it to you, but it is so very important that it needs to be kept constantly before us. It is a subject that is very near and dear to my heart, because so much depends upon this work for the future comfort and usefulness of these teeth to the patient.

It is not my purpose, nor do I arrogate to myself the ability to tell you anything new on this old, worn, thread-bare subject; but it is my desire and hope to elicit a good, hearty discussion and stimulate a greater interest for the very best efforts along this line of endeavor.

Never before in the history of dentistry has treatment and filling of root canals received so much attention as they do at the present time, and all because of the introduction of the radiograph. "Seeing is believing," and since the dental profession has been able to see so many of the imperfections and ill results from its work, we as individual dentists have been stimulated to better our efforts in this particular line of work.

The successful treatment of root canals not only gives joy and comfort to the patient, but to the dentist. I know of no operation that he is called upon to do that always brings that keen sense of exhilaration as the successful treatment and filling of root canals.

It is the natural expression of his better nature trying to rise to his ideal. I will say at the out-set, for fear of being misunderstood, that it is not my intention to give the technique of treating the various kinds of abscesses on which so much could be said, but I will endeavor to adhere to the subject of the paper.

For the sake of convenience I will divide root canals into two classes, namely, accessible and inaccessible. With the former class I will not dwell to any extent, for we are all familiar with, and get a minimu amount of trouble from the treatment of single-rooted teeth; also distal roots of lower molars, and lingual roots of upper molars. B the inaccessible class we will direct our attention, for these are the ca which give us the maximum amount of trouble.

In the treatment and filling of root canals we must constantly ha in mind the things which we wish to accomplish, namely, the remo of all organic substance from the pulp chamber and canals, as much o contents of canaliculi as possible, to put into permanent sterile condition, to stimulate the circulation so as to remove infection and establish tissue repair in the periapical region, and last but not least, to seal permanently these spaces with an everlasting, non-irritating, antiseptic filling.

There is no operation in dentistry where skill and so much patience, coupled with accurate knowledge of the anatomy of the different roots acquired by experience, counts for so much as in the treatment and filling of root canals. Every operation of this kind should increase the skill of the operator for each succeeding operation of similar character. Undoubtedly the greatest number of failures in root canal work is due to lack of sufficient opening of pulp chamber.

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*Read before the Cleveland Dental Society, 1912.

It is nothing short of an impossibility to treat these canals successfully, unless sufficient opening has been made that we can see the orifices of the various canals, and enlarge the canals sufficiently to enter them with instruments and pass medicaments into them.

The writer has no hesitancy in cutting away enough of sound tooth structure, if necessary, to accomplish this purpose, for the usefulness and comfort of the tooth after treatment depend upon the degree of cleanliness into which they have been put, and the completeness of their filling.

In the treatment of teeth we have to deal with both living and dead pulps. We will first consider living pulps.

As in all operations where infection is a prime factor, the simple technique of the writer is to have the hands clean and as nearly sterile as possible, having all instruments previously sterilized and every precaution taken to prevent infection.

In dealing with teeth containing living pulps, the first essential is to isolate the tooth on which we are to operate and to sterilize same; also the adjacent or proximating teeth if these have been placed through the rubber dam.

My method of approaching these pulps in the greater percentage of cases is by pressure anesthesia. By this I do not mean I have discarded the use of arsenous acid entirely, for in a small percentage of cases where, for some reason or other, anesthetizing is impossible or contra-indicated, I still use it.

Now having the pulp in a painless condition, it is not difficult to open pulp chamber sufficiently with fissure burs to see the orifices of the various canals, and having selected a sterile barbed broach of suitable size, it is ssed into and to the end of canal if possible before pulp is withdrawn. n canals are too small to enter with small barbed broach, I use the us sizes of Downey and Kerr spiral broaches and reamers, with the of fifty per cent. sulphuric acid to enlarge the lumen of canals. In s connection I should like to emphasize the use of sulphuric acid because accomplishes several desirable purposes. It disintegrates the tooth ucture and in connection with bicarbonate of soda, brings to the surface of the pulp chamber the small particles of disintegrated tooth structure, the small detached fragments of pulp tissue, and is also a very efficient antiseptic.

Having enlarged the constricted portion of canal, a smooth Donaldson broach is passed into same to determine whether the apex can be reached. Before using the smooth broach, however, the sharp point is removed by revolving between forefinger and thumb and holding point against Arkansas stone; this not only removes the very sharp point, but it leaves a well-rounded point instead, which is not so prone to engage the wall of pulp canal as it passes along its course. After this has been done the barbed cleansers will usually pass along much more freely.

Having removed the organic tissue from the canals, it is my practice to seal into the canals which have been surgically operated upon, an anodyne dressing, such as Black's one-two-three mixture, until the second sitting, when the canals are inspected for any remaining pulp tissue and filled, providing the history of the case has been favorable.

In teeth in which arsenic has been the devitalizing agent used, I seal into the pulp chamber, after canals have been cleaned, a dressing of Formo-cresol until the second sitting, when the canals are filled, providing the pulp tissue has all been removed and no soreness present.

In dealing with teeth containing putrescent or partially decomposed pulps, the same technique is used in opening up pulp chamber and canals, except more precaution is used in entering canals because of danger of forcing septic micro-organisms into periapical region if they are not already in that locality. At the first sitting little is done except to open and mechanically cleanse cavity and pulp chamber, sealing into pulp chamber with a quick setting temporary cement, a dressing of Formo-cresol, leaving for a few days, when it is removed and the canals as thoroughly cleaned as possible by instrumentation and the use of sodium dioxid, which is one of the best agents, if not the best, we have at our command for cleaning putrescent root canals at the present time. This chemical compound was introduced to the profession in 1893 by Dr. E. C. Kirk, to whom the profession owes a great debt of gratitude.

In my review of various writers on this all-important subject of root canal treatment, I was astonished to find it referred to so little. The action of sodium dioxid in connection with peroxide of hydrogen not only decomposes the micro-organisms in these canals, but also disintegrates whatever organic tissue may be present. It also sets free ozonized oxygen which oxidizes whatever coloring matter may exist, not only in the canals but the canaliculi as well, providing no coagulating medicaments have been previously used. In the last three years I have not been using coagulants in root canal treatment and have been getting much better results since discontinuance of their use. Their use defeats one of the very objects we wish to accomplish by closing the minute openings of canaliculi, and sealing in their contents, which so often is the cause for future trouble.

Unless for some pathological condition in the periapical region requiring a subsequent sitting, the canals are washed out with absolute alcohol, thoroughly dried to the apical ends and filled.

I have given you a general outline of my technique of treating root canals, but the variations are many, and hope enough has been given to bring out more in detail by the able discussion which is to follow.

Eucapercha compound and gutta-percha cones or points is the root filling which I use, because of having many advantages over many other root filling materials, being antiseptic, non-shrinkable, non-absorbable, very agreeable to the tissues, removable and not penetrated by the X-Rays. Many root filling materials have been brought before us, but none have possessed the requisites of being infallible. If there has been any one excuse that has been over abused for incomplete treatment and filling of root canals, it is the one of which we hear so much, shrinkage of the filling material. If the scientific treatment and filling of root canals is closely followed, it is the firm conviction of the writer that only a very small percentage of cases need be lost.

Of all the pursuits of man which contribute to the highest welfare of the human race, our calling is made honorable and distinctive because of Divine example. Therefore let us hope that it may be our privilege to do our work gladly and as thoroughly as it is possible to do, and not to be slaves of custom and precedent, but the servants of our better selves.

## DISCUSSION.

HARRIS R. C. WILSON: It is easy to discuss a paper if one can honestly disagree with the essayist. In this paper there is little to which I can take exception; therefore, I can only emphasize certain points. The essayist calls attention to the need of thoroughly opening into the pulp chamber, until we can see the orifices of the canals; this is most necessary, for we must have direct access to a canal if we expect to do thorough work. The essayist mentions the cleaning of the hands and rendering them as *nearly sterile* as possible. He evidently does not think it possible to sterilize his hands. I agree; it is *not possible* and *not necessary*. Of course, have the hands clean and do not, after washing, reach into your pocket for a knife to clean the finger nails and go directly to the patient's mouth. It is necessary to wash again. The reason I say that it is not necessary to sterilize the hands is this: Nothing that we introduce into a root canal should be handled with anything but a sterile instrument. I mean to include all cotton in this statement.

The essayist and I agree upon the use of barbed and spiral broaches in cleaning canals. Sulphuric acid ($H_2SO_4$) 50% is to my mind the most satisfactory drug to use in enlarging small canals. There are two things we must have in mind in using sulphuric: one is to prevent its passage beyond the apex of the root, and, to keep the acid away from the crown of the tooth. Sodium bicarbonate ($NaHCO_3$) should be used to neutralize the acid and then all excess of the alkali must be removed, as alkalis are incompatible with formaldehyde (Buckley, P. 64), and I presume most of us are using formaldehyde in root canals. The essayist tells us he uses a dressing of Black's One-Two-Three after removing the contents of canals, and in the next paragraph tells us he does not use coagulants. Phenol is a constituent of Black's One-Two-Three, and I believe that is a coagulant.

I have no objection to coagulants and, in fact, I do not see just how we can get along without using them. Black's One-Two-Three is an excellent compound, in my opinion. However, I believe we may expect the best results from formaldehyde and cresol or formaldehyde and creosote as a dressing, both before and after cleaning canals, whether we use cocain, arsenic, sulphuric or (NaK) sodium-potassium.

As to root filling materials, I must say that I have removed some very foul guttapercha root fillings, which I have reason to believe were made with guttapercha and eucalyptus oil. I therefore have discontinued the use of eucapercha in root fillings. In its place I use a preparation of formaldehyde, creosote, thymol and alum, known as Oxpara. This is not a nostrum, for the ingredients are published and a nostrum is a preparation, the contents of which are kept secret. My results have been so satisfactory with Oxpara that I have come to be a firm believer in formaldehyde and creosote.

I can only quote Buckley for a chemical explanation of the value of formaldehyde as a therapeutic agent. We are told that in putrescent pulps we have liberated two gases; hydrogen sulphid ($H_2S$) and ammonia ($NH_3$). The action of formaldehyde upon hydrogen sulphid ($H_2S$) is to form methyl alcohol and sulphur. Buckley, 299)—($2CH_2O$ and $2H_2S=2CH_3OH$ and $S_2$). The action of formaldehyde on ammonia is to produce urotropin and water—($6CH_2\ O$ and $4NH_3=(CH_2)\ N_4$ and $6H_2O$). Buckley says it is stated on good authority that formaldehyde acts favorably upon ptomaines forming inodorous compounds. All this being true formaldehyde is a most useful drug, but it has one objectionable quality; it is irritating to soft tissue. Buckley and others have found that cresol (tricresol) is a desirable drug to use with formalin (37% formaldehyde), because it combines with the fatty end products of the decomposition of proteins of the pulp and because of its tendency to allay the irritating effects of the formalin. For root filling for very small canals we find Buckley recommends the use of formocresol with (20%) thymolized calcium phosphate. ($Ca_3(PO_4)_2$). Oxpara is formocreosote with thymolized alum. Alum ($Al_2K_2(SO_4)_4+12H_2O$) is a strong astringent, and I can see no harm but much good from this astringent action in contact with soft tissue at the apex.

In Oxpara we have the drug creosote used instead of cresol. Buckley says of this drug that it is used chiefly because of its analgesic property and adds that creosote and formaldehyde make an excellent remedy for treating putrescent pulps.

In both Buckley's favorite remedy and Oxpara we have the essential formaldehyde with its irritating action reduced to a minimum. Now it seems to me that it remains for clinical experience to say which is better, cresol or creosote in combination with formaldehyde. Both give quite satisfactory results, therefore I feel that if we are using one or the other with success we should continue; but if we are having trouble then make a change.

It is my practice in treating and filling root canals to use the rubber wherever possible; to sterilize the field of operation, teeth, clamp and rubber with alcohol, then to open the tooth with a sterile bur, that is a bur that has been sterilized by boiling and just before using dipped in alcohol. Most of the debris is wiped away with cotton pellets and alcohol, because I do not like to inhale the dust made by the bur if blown away by compressed air.

We do not handle the cotton used in the tooth with anything but the cotton pliers. Absorbent points sterilized in formaldehyde gas, and broaches sterilized by boiling and dipped into alcohol just before *each* insertion into a canal, are the means of cleaning the canals with the aid, of course, of ($H_2SO_4$) sulphuric acid 50%, or Schreier's paste (NaK). The liquid of Oxpara (formocreosote) makes my usual dressing. If I want something less irritating, I use Black's One-Two-Three, the same as the essayist.

In filling root canals I use a paste made of Oxpara liquid and powder worked well into the canals into which I gently force a Canfield guttapercha point to the predetermined depth.

In concluding I desire to urge even more than the essayist the great value of radiographs in any case that is not just normal, in fact, they would be a help in almost every case.

W. P. SMITH: I wish to compliment the doctor's paper, and I am sorry that I shall be obliged to disagree with him on some few points. The doctor speaks of the subject as "thread-bare;" that may be true to a certain extent, but when we are called upon to remove canal fillings composed of cotton and a large variety of the so-called scientific combination abscess cure and root canal filling, which are placed in teeth with no attempt made to fill the small canals, I am led to believe that this subject is yet new to many.

I agree with the essayist when he says, "The successful treatment and filling of root canals brings joy and comfort to the patient," but to the dentist it brings backache and the ruination of his eyesight, which, I think, is the reason it is so often slighted.

I agree with the essayist that "this operation requires more actual skill, patience, and a more accurate knowledge of the anatomy of the tooth than most operations which we are called upon to perform." The doctor has well said that "the usefulness and comfort of the tooth depends upon the thoroughness with which we are able to cleanse and fill the canals." This brings to my mind an incident which occurred at one of the first dental meetings which I ever attended. An elderly dentist had read a paper on "Cavity Preparation," and in the discussion which followed, the opinion seemed to be quite general that the doctor cut away *too much* sound tooth structure. In answering the discussers, the doctor made this statement: "Perhaps I do cut away a good deal, but I always try to *save* what I do *leave.*" This always comes to my mind when I find it necessary to do any unusual amount of cutting, and I feel that I am justified in doing the cutting in order to *save* what I leave.

Every precaution should be taken to have everything connected with the operation as nearly aseptic as is possible. The rubber dam should be used in all cases where it is possible to apply it.

For the removal of the pulps, the essayist says that he uses "pressure anaesthesia in the majority of cases and arsenic in a few." Now I should reverse that, as I use arsenic in the majority of cases and pressure in a few. For devitalizing, I use Dr. E. C. Kirk's formula, which consists of

| | |
|---|---|
| Acidi arseniosi | |
| Cocaini hydrochloratis | āā gr. XX |
| Menthol cryst. | gr. V |
| Glycerini | enough to make a stiff paste |

One or two minims of glycerine is sufficient, as the menthol liquefies. In applying this paste, I prefer to place it in a freshly drilled hole in the dentine, where it may be sealed in with no danger of its leaking out and coming in contact with the soft tissue. It is more readily absorbed by the dentine when applied in this manner and seldom, if ever, causes pain.

I agree with the doctor in the use of "sulphuric acid," as I know no other means by which the canals can be so thoroughly cleansed.

The doctor speaks of the use of the "smooth Donaldson broach;" the smooth broach is the only *safe* broach to use in connection with sulphuric acid, especially in small and tortuous canals. The average barbed broach has too many barbs and the barbs are also too long. I usually file off about half of the barbs with a fine file before attempting to use the broach at all.

After removing the pulp tissue from the canals, it is my practice to cleanse the canals with sulphuric acid, neutralize the acid with bicarbonate of soda, dry with hot air and absorbent points, after which I insert a dressing composed of iodoform dissolved in eucalyptol. I prefer this solution in most cases to any of the oils, as it establishes and maintains asepsis and does not discolor the tooth.

The essayist speaks of the use of "formo-cresol as a dressing." Where arsenic has been used for devitalizing, cresol makes a very excellent dressing, especially if some sensitiveness is still present at the apex; but I can see no use for the formalin unless some decomposition has taken place. When formalin is sealed in a tooth and kept at body temperature, it constantly gives off gas, which, if allowed to come in contact with living tissue at the apex, causes a considerable irritation and an equal or greater amount of pain. When dealing with teeth containing putrescent pulps, formo-cresol is one of the most efficient remedies which we have at the present time.

I use sodium dioxide very little, on account of the difficulty in handling it, and a bleaching agent is not required as often where sulphuric acid is used; but if a bleaching agent is required, I use 25% pyrozone.

"Eucapercha," of which the doctor speaks, has not been as successful in my hands as chloropercha in filling root canals. The eucapercha does not solidify sufficiently to hold the point in place, and is too easily dislodged in preparing the tooth for filling, or in preparing the root to receive a pin.

In preparing my chloropercha, I use white temporary stopping instead of base plate guttapercha. The temporary stopping contains more earthy material and when dissolved, forms a jelly-like paste, which is not stringy and does not shrink when it hardens.

When my canals are ready to fill, I first wash out the canals with alcohol and dry thoroughly with hot air; I then moisten the canals with the solution of iodoform and eucalyptol and again dry with hot air. This volatilizes the eucalyptol and leaves a thin film of iodoform adhering to the walls of the canals and renders them permanently aseptic. I next carry the chloropercha in small globules to the end of each canal with a smooth broach, being careful not to trap any air in the canal. The paste will be seen to adhere to the walls of the canal, and when sufficient paste has been inserted to cover all the walls, a guttapercha point, the tip of which has been dipped in the paste, is gently forced to place, allowing any excess of chloropercha to be forced out by the point.

There are so many points to be considered in the treatment of root canals and any of the rules laid down are subject to so many variations that it is impossible to anywhere near cover the subject in one paper, and I hope the subsequent discussers will emphasize some of the points which I have passed over.

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# TREATMENT OF DEVITALIZED TEETH*

BY DON M. GRAHAM, M. D., D. D. S., DETROIT, MICH.

IF WE VIEW DENTISTRY from the standpoint of conservation of dental organs, we must admit that the ability to construct on devitalized teeth all manner of restorations is the greatest discovery in dental science and art. The successful reclamation and obliteration of root canals, as the profession now knows it, dates back possibly not earlier than the beginning of our Civil War. Undoubtedly, many dentists, by diverse methods, attempted to conserve devitalized teeth at a much earlier date, but it can truthfully be said that with the beginning of guttapercha root canal fillings could the profession as a whole lay claim to successful treatment of these devitalized organs. Since this time scores of materials have been suggested and used for the same purpose, but it can be said, we think without fear of successful contradiction, that up to this date nothing has surpassed, if equalled, gutta-percha as a root-canal filling.

Let us consider for a moment the surgical anatomy of the dental canal which has been robbed of its pulpal tissue. Opening into it are innumerable tubuli whose lumen contain remnants of pulpal tissue or fibrillae. It has been conclusively proved that a septic root, containing as it does innumerable septic tubuli, can not by the strongest antiseptics be sterilized beyond a short distance of the canal wall. Bichloride of mercury and even formo-cresol are incapable of sterilizing the dentinal tubuli.

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*Read before the Southwestern Michigan Dental Society, 1912.

This being the case, it is imperative that our root canal proper be obliterated if we expect to prevent absolutely reinfection from this source. Theoretically, it would be necessary to completely obliterate the canal to the apical foramen before we could reasonably hope for success in the treatment of septic teeth. Practically, however, nature coming to our assistance, many of these teeth, although their root canals be not obliterated throughout their entire length, remain comfortable and serviceable. But in these cases we can find, almost without exception, radiographic evidences of inflammation and liquefaction of apical tissues, although the phenomenon does not rise to the plane of clinical observation .

Let us consider for a moment a few essentials of a successful *permanent* root-canal material. It must be easy of manipulation and insertion. Non-irritating to the tissues so that accidental protrusions may cause the least possible reaction. It should be non-absorbable, that the tissue fluids can not disintegrate it and convert it into a fertile field for infective processes. It should possess sufficient resistance to the X-Ray to enable us to ascertain the condition of our root-canal filling. It should be easy of removal to permit of after-treatment of the canal, or the insertion of a dowel. It should not possess medicinal activity to cause deterioration of the apical tissues. Considering these as *some* of the essentials, there are but two materials now in use which can lay claim to any right to be considered permanent root-canal material, gutta-percha and paraffin, whose melting point is not less than 135° F.

There have been so many short-cut methods offered for the treatment of devitalized teeth that the object of this paper would be accomplished if it established the fact that mummification, medicated cottons and powders, and paraffins, as ordinarily used, are scientifically wrong and in most cases expose the patient, on whom they are used, to a very serious danger. I have taken it for granted that we have all outgrown the mummifying fallacy, and that we no longer sanction medicated cottons and similar fibers. The use of medicated powders we know to be very general today, but when we recall that these will become disintegrated by the fluids of the apical tissues, and that they have the more serious defect of acting deleteriously on the tissue cells on account of the constant action of the incorporated drugs, we realize that their use is scientifically wrong and that their employment as a permanent canal obturator amounts almost to malpractice. Their employment as temporary treatment can be justified, and in this connection their use in deciduous teeth can be sanctioned, although their employment is not entirely without danger. The insidious liquefaction of the apical tissues, where these powders are used, is proven by the radiograph, which shows often large areas of necrosis over teeth which indicate no outward appearance of disease.

Some of the worst cases of necrosis the writer ever has seen have occurred over teeth treated in this manner, and the seriousness of the condition was not revealed until a vast area of osseous structure was destroyed. The tissues, no doubt, succumbed gradually to the action of sepsis, after their vitality was reduced by the deleterious effects of the medicaments. We shall therefore conclude the consideration of root-canal materials by saying: up to the present time theory and practice seem to accord to gutta-percha a place of pre-eminence. The hard paraffin, as suggested by Dr. Prinz, is full of promise, but it will require many years to demonstrate whether the profession can uniformly fill root canals successfully with this material, and it must be remembered that the average devitalized tooth will remain comparatively comfortable for a varying length of time, with "any old thing" as a root-canal treatment. It is this tolerance and resistance of the apical tissues that has permitted the exploitation of so many unscientific and injurious methods for root-canal obliteration.

Regarding the recently devitalized tooth, it seems immaterial whether we remove the pulp by high pressure, arsenic or under analgesia, the necessity of asepsis is paramount. The rubber dam, the sterilized broach, and in so far as we can, aseptic root-canal materials are demanded. A succession of lame, recently devitalized teeth can often be explained by the use of septic broaches. The tooth, recently devitalized, or the tooth which suffered little peridental inflammation when filled with a suitable root-canal obturator, appears to be quite as useful a member as is its vital fellow. It is only when we fall short of sealing the apical end by our root-canal material, that we court future trouble. But the fact is, however, that very few teeth are filled just to the apical end, and the possibility of hermetically sealing the apical foramen of a tooth in situ is questionable. One hundred radiographs of devitalized teeth would show probably not more than ten perfectly filled root canals, with twenty-five per cent. of canal treatments falling a little short of, or pressing a little beyond the foramen, the balance ranging anywhere between the pulp chamber and the upper third of the root canal. As has already been stated, it is only nature's kindness that permits us to construct on the majority of our devitalized teeth, comfortable and serviceable substitutes..

It might reasonably be expected that teeth with normal root canals could invariably be filled to the foramen. Indeed, a much larger percentage of them could if more time and care were taken with our root-canal operations. It is the opinion of the writer that most failures result from the fancied necessity of charging only so much per for this class of work, and the inevitable haste in its performance. The first prerequisite for successful root-canal work is the consciousness by the operator, that he is to be adequately recompensed for his time and skill. Such remuneration would appear to be not less than the fee exacted for an inlay in the same tooth. The skill demanded for its successful accomplishment is certainly greater, while the importance of its successful outcome is infinitely superior to any restoration which might be demanded.

The teeth to give us the greatest amount of trouble are undoubtedly ones with constricted and tortuous root canals, but to their credit let it be said, that these teeth are less likely to give after-trouble if imperfectly filled for the reason that there is less space for septic matter. Until very recently, the putrescent canal caused us much uneasiness, but with the advance in dental therapeutics in recent years, the uncomplicated putrescent tooth is approached with as little concern as is the recently devitalized tooth. With the formo-cresol treatment, the putrescent canal proper is made aseptic and its lumen, obliterated quite as readily and successfully as its fellow which has been but recently devitalized. To be sure, some care must be exercised in dealing with the putrescent condition that septic matter may not be forced into apical tissues. The average case will require not more than three or four treatments to place the canal in an aseptic condition and ready to receive the canal filling.

Drug worship has been quite as evident in the dental profession as in other departments of the healing art, and we have too long hoped for some drugs or combination of drugs that could be depended upon to relieve all pathologic dental conditions which present for relief. The truth is but few drugs possess any real specific virtue in the treatment of dental lesions. A working acquaintance and an intimate knowledge of a half dozen well selected drugs, far outweighs the possibilities of the employment, indiscriminately, of several score. I have neither the time nor the disposition to enter lengthily into the question of dental therapeutics which is a subject of sufficient importance to demand a separate and serious consideration. Only in the most general way shall I touch upon it and, in passing, hazard the statement that the last few years have given us nothing new, that is particularly and strikingly helpful in this department of our work. The importance of mechanical cleansing of root canals, the removal of every vestige, where possible, of nerve filaments and debris, is most important.

Where the infection has already invaded the apical tissues we have a very difficult problem to solve. In the first stage of inflammation our treatment should be sedative and abortive. Opening into the pulp chamber and permitting the escape of gases, pus or blood, will relieve pain frequently, and will tend to abort the inflammatory condition of the apical tissues. An anodine treatment to a congested pulp for twenty-four hours will allow of its successful devitalization by arsenic. Tincture iodine and aconite, as a counter irritant, will sometimes be found useful. If resolution does not take place and the pericemental tissues become involved, we have a situation most trying to the patient and operator. In the presence of a septic canal we might hesitate to reach the infected apical zone with a broach, yet this procedure is often the wisest course to pursue. The abortive treatment should be kept up with the idea of relieving pain. Counter irritants in the form of tincture iodine, hot water, or capsicum plasters can be used to hasten its termination, if we can not relieve the pain, which, if it persists, should be relieved by Dover's powders, magnesium sulphate, or even morphine may be administered. Hexamethalinamin, of which urotropin is a proprietary type, can be administered in ten-grain doses every few hours if necessary. Or we may anticipate the natural evacuation of the pus by making an artificial fistula over the inflamed area. When any considerable area has become liquefied, it is best to curette.

Sufficient tooth substance should be removed to permit a broach to enter in line with the root canal. Tooth substance can always be replaced by an indestructible material, and a good rule to follow for the cleansing as well as the filling of small root canals, is to open sufficiently until the entrance of that canal can be seen.

It is often safer and better to proceed with fine straight broach in tortuous and constricted canals until the apex is reached, when the lumen can be enlarged by the barbed broach or the spiral hand-broach. Sulphuric acid can be used to good advantage in reclaiming these constricted canals, but it is exceedingly dangerous practice to use any form of engine reamer in these small roots. Sometimes we encounter canals which are anatomically impossible of complete cleansing, and sometimes we have the misfortune of breaking a broach, which prevents further advance. We are then compelled to make the best of an unfortunate situation, and one on which there seems to be no agreement. Then again, in our endeavor to reach the foramen, we may perforate the root. It might safely be said that the dentist who does not occasionally perforate a root does not show sufficient zeal to do generally high-class root-canal work.

With our canals in aseptic condition and sufficiently enlarged to receive the root-canal treatment, we are ready for the permanent obliteration of the same. Moistening the canal with eucalyptol and menthol, chloropercha can be pumped into the canal with a suitable probe. The gutta-percha point, which has been carefully selected for size and dipped in alcohol, can follow and be pressed home. Pain responses are not always an evidence that we have reached the foramen with our material. Indeed, the occluded air is not infrequently the cause of this outcry of the apical tissues. The use of chloropercha is not without its dangers, but it appears to possess more advantages than disadvantages, and for this reason only its use is recommended.

In the recently devitalized tooth we are more likely to fall short of complete obliteration of canal for the reason that the peridental tissues will resent the advance of gutta-percha point and occluded air. With the once putrescent or gangrenous canal, the apical portion especially is enlarged, particularly if an abscess condition prevailed for some time, so that there is a danger of over-filling, quite as much as under-filling. In these cases it is good practice to cut the apical end of the gutta-percha point. If we reach the apical foramen, we may consider ourselves fortunate. If we fall slightly short of it we will probably never learn of our short-coming. If we fall considerably short of it, we are more than likely to get an infection through the dentinal tubuli, or a re-infection from the same source, if the case was a putrescent one. On the other hand, if the material is forced through the foramen, there will be a soreness and an inflammation depending on the amount of material and the degree of resistance of the tissues. Teeth with putrescent canals or apical abscesses are more likely to have more protrusions than those more recently devitalized, but since the tissues have undergone inflammatory processes there is less likelihood of severe irritation, and more probability of an early encapsulation. In either case, if the irritation continues, treatment is demanded, and if the canal material is the only offending factor, it is comparatively easy to anesthetize, cutting down and removing the offending material by scalers or burs when the case may confidently be expected to continue to complete recovery. If, however, the tissues about the apical end have become resorbed or the root eroded, and itself becomes an irritant, it is then necessary to remove such portion by means of bur or chisel, when the case may be expected to progress to comfort and usefulness. The amount of root that can be sacrificed in such cases is exceedingly large, and it is surprising with what comfort and satisfaction amputated roots perform their function. In multi-rooted teeth one root can be sacrificed, and often a servicable restoration in the shape of a crown or a bridge may be the result of such an amputation. Caution is demanded in the region of the maxillary sinus and the inferior dental nerve, in amputating or even curetting, for the removal of the septic areas.

In case of perforation of the root, it is by no means necessary to consign such a tooth to the forceps for with care and patience the majority of these can be placed in good repair. If the perforation is located in the upper third, repair may be attempted, by the use of gutta-percha or amalgam—preferably the latter—canal filled and if trouble arise, the upper part may be safely amputated if it be an anterior tooth. In the lower portion of the root, perforation is less frequent, and more easy of access when repair can be made and canal filled. If irritation follow, the outer border may be planed by scalers, burs, and sometimes small stones. If any evidences of sepsis remain, after these attempts have been made, there is but one course to pursue and that is the extraction of the tooth. We can not afford to leave a focus of infection which may at some inopportune time contribute to the grand total of adverse forces which may precipitate a serious illness.

Too many of us have viewed with complacency the abscessed tooth with fistulous opening, pouring forth its products of infection to be passed into the alimentary canal. Recently, however, more serious attention has been given to this as to all other pyorrheal conditions, for have we not read and listened to the fearful consequences which follow the ingestion and absorption from the alimentary canal, of such products? No attempt is here made to minimize the systemic dangers of pyorrheal conditions. Indeed, every effort should be directed toward the obliteration of such foci of infection to the end that the body forces as well as the dental structures may be conserved.

Little if any attention, however, has been given to the dormant abscess, a condition far too prevalent and revealed only by the radiograph. Innumerable teeth have on their apical ends pus sacs whose contents enter directly into the blood current and for this reason the danger is undoubtedly greater than when the pus first enters the alimentary canal which, in the healthy individual at least, is able to prevent its absorption, and where to a great degree the acid gastric juice destroys its virulency.

The subject of anaphylaxis sheds a flood of light on this obscure chapter of dental pathology and explains why pyorrheal patients, enjoying good health, will sometimes react to a simple apical abscess, by symptoms both local and constitutional of the most violent character. We have two kinds of digestion—entral or that which takes place through the alimentary canal, parentral or that which takes place in the tissues after directly entering the circulation. Every grain of protein that we eat, every germ that we encounter contains a poison from which we are saved by a wise provision of Nature. Through the alimentary canal wall this poison is not diffusible, if the tissues be in a healthy condition, and besides the digestive ferments break up the protein molecule (germ life, etc.) into non-poisonous constituents which are diffusible and which enter into the circulation to be appropriated to the maintenance of the organism. When these vegetable cells or germ life enter directly into the circulation by way of the pulp canal, for instance, we have no alimentary canal wall to protect the organism and it is in truth, a war to the death between them and the body cells. If the invading germs can split up the tissue cells, they wax strong and multiply, when we have a train of symptoms which are so familiar to all of us, as seen in acute apical abscesses. If the cells of the body can elaborate, ferment and split up the invading germ molecule, the conflict stops short of abscess, and absorption of toxins and poisons, which are responsible for these local and constitutional symptoms. Anaphylaxis is the study of this process and its effects. How important then that we should give the greatest possible care to the complete obliteration of root canals to the end that no infection may be permitted to invade the tissues, and how equally important that we do not incorporate any nascent drug in our permanent root-canal material that will lower the vitality of the apical tissues. The action of a drug in medicated root-canal materials, if at all active, can not be anything but deleterious to the tissues, reducing their vitality and rendering them a more easy prey to the attacks of micro-organisms. Surgery has practically discarded antiseptics and germicides in dressings for wounds, for the reason that the mildest of them seriously interfere with delicate tissue repair. Radiography has conclusively shown that teeth so treated have about their apical ends, tissues that have undergone solution and disintegration, and there appears to be not a single scientific reason why a drug should be placed in the permanent root-canal material. It would appear then that we have, at the present writing, but one root-canal material which in any way approaches the ideal. The wax or hard paraffin, with an improved technique, may shortly displace this material, but it must be remembered that it will require thousands of operations extending over a period of years before we can be justified in assuming its superiority or even equal. In the meantime let us bend our energies to the improvement of this class of work that we may prevent much unnecessary infection and suffering.

To assist in the discussion of this important subject we shall summarize:

Our work should be characterirzed by the strictest regard for asepsis.

A greater remuneration is demanded for this class of work and it may reasonably be expected that there will be fewer faulty root-canal operations when we are more adequately compensated for our time and skill.

An intimate acquaintance with the anatomy of the dental pulp and its surroundings, as well as its pathology is most necessary.

Drug worship, in the treatment of devitalized teeth, must cease if we are to do effectual and permanent work. Mechanical efficiency is imperative since obliteration of canal is the only scientific substitute for the dental pulp.

The impossibility of complete sterilization of dentinal tubuli explains many reinfections and sub-acute inflammation about devitalized teeth.

The coronal end of canal should be sealed with a high-grade impervious cement, and careful cementation of dowels, to prevent air spaces, is earnestly recommended.

Therapeutic treatment should not be carried beyond reason, nor should an active drug form any part of a permanent root canal filling. A tooth which does not show evidences of improvement after the fourth treatment should be radiographed as should all doubtful and prolonged difficult cases.

Protrusions of root-canal material, when offending, may be removed by scalers or bur, but when apical end of root is itself the source of irritation it should be planed or amputated. A tooth which does not yield to the latter treatment should be extracted.

A perforated root can generally be successfully repaired but if such a root still remains the source of infection, after reasonable surgical treatment, extraction is demanded. Tooth devitalization is a more serious undertaking than we are wont to consider it.

Lastly, a commission composed of scientific men supported by the profession, could do much in establishing scientific data on the question of root-canal treatments and materials and spare us the spectacle of being informed and edified on this subject by some of our aggressive dental supply houses.

## DISCUSSION

Dr B. R. Parrish, Battle Creek. I am very sure after such a talk so well delivered, there is very little that can be said against it by way of argument.

Dr. Graham sent me an outline of what he was going to say and I have studied it with much interest. I quite agree with the doctor that the root canals should be entirely obliterated in all cases that are possible and that they should be filled with a non-irritating substance. I have never had any experience with paraffin but while gutta percha points have been long in use, nothing better has been so universally satisfactory. The X-ray work Dr. Graham has been so successfully carrying on has been very interesting and profitable from both a financial and humanitarian point of view. The X-ray certainly does show quite the exact condition of things. I am not anxious that Dr. Graham turn on the X-ray on all of my work. I know I have made mistakes but I take comfort in the fact that the only ones who do not make them are the dead ones and the unborn.

I have filled a great many root canals with oxpara alone and have afterward had made X-ray films which revealed a normal condition as far as I was able to tell. I will confess that I have and do use oxpara and Brother White's ab-conker in connection with gutta percha points and in some cases without the points. I have been doing this for ten years and have had very little trouble. I believe we should be more careful in our treatments, take a little more time and make a charge accordingly.

You may have read in a recent number of *Collier's Weekly* of the wonderful research work done by Dr. Carroll of the Rockefeller Institute. This man has done some wonderful things in surgery. This institute is financed by Rockefeller for research work only and I wish some of our influential fellow dentists could encourage some philanthropist to finance a similar institution for our work. We are making rapid progress but I believe the field is large and many scientific facts yet undiscovered.

Dr. F. H. Essig, Dowagiac: This is a subject that has been bothering me for twenty-five years. I have been at conventions and gone home a good many times thinking that I was guilty of malpractice in trying to fill these canals. There are two reasons why we do not fill these canals properly, and 80 per cent. of the dentists don't.

The first reason is, as the Doctor has given, on account of our pay. We don't get enough money and we can't do the work. If we were to fill a molar properly, it ought to take from three to four hours' good hard work, and we have a stated price for the people in the country from $1.50 to $2.00, and the largest that I have ever heard of was $3.00. We cannot give up three hours of our time for $3.00. I know I can't and support my family.

The second reason is that in many cases we cannot get into those canal roots. It is almost impossible in many cases. I always felt that the only treatment was to fill these canals with gutta-percha, which in my opinion is the only safe root canal filling. In the anterior root of a second inferior molar it is almost impossible to fill and sometimes I just close my eyes and go at it and I trust to luck and I have very good luck, too.

I think Dr. Graham gets good fees, and also Dr. Barber. They tell us how to do it, but when we can get $7 for preparing one small cavity, $5 for anesthesia and $10 for preparing a tooth for gold crown, we can afford to do it also.

If we could get these fees we could do that work better. If I can get $10 an hour, I will spend more time and do better work on these roots. I think Dr. Graham's talk is alright theoretically but I can't use it in my practice, and I am afraid that there are a lot of you in the same boat as I am.

As for the treatment of root canals, leaving unmedicated fillings in them, I have one tooth in my mouth that has been filled three years, that was put in for test with paraffin. The tooth was quite sore at the time, but I have never noticed the tooth since. I have been waiting for three years, and I am still waiting, for the results. It is still in there and it is saturated with paraffin. I tried it and it worked out very nicely. It has been a success for the last three years. I have had no trouble at all and it was in a bad condition when I filled it.

I enjoyed these lectures very much and I am sorry that the doctor did not give us some ideas how to fill these hard roots, to preserve them in a more simple way. As I say, I sometimes shut my eyes and get what I can out of it and let it go.

Dr. ——: I don't know whether I can say anything to help the trouble. I certainly do have trouble with these fillings. I suppose the reason I was called upon to discuss this work was because I have been doing considerable X-ray work lately. That doesn't help a good deal except as you follow it up and keep using it. How many dentists come to me and say: "Well, your theory is all right, but who is going to practice it?" I would like to say this much, that it is not theory, it is medical science. There is no other way about it. It is not theory. Of course it looks like theory but it is only science. When it comes to treating teeth where there are abscesses on the roots, the X-ray shows that most of the root canals are easily accessible.

There seems to be something about live root canals—something about the teeth where you just take out the pulp where it is killed. It seems to hang there. The important part of that condition is to get your pulp dead enough so it won't come to life a couple of weeks later. It is this coming to life that puts so many people on the wrong track. I believe that correct from what X-ray pictures I have taken. If you put these root fillings in, and if your pulp starts to come to life later, it is the same as if we had come to the apex. Most of the teeth have sick pulps. The pulps are excavated even if they are not dead. If you don't remove all the pulp, you have good food for a bad abscess. It is going to die and it sometimes takes three years. The X-ray will show that there are a great many more abscesses than we have any idea of. You can fill up a root of that kind, but it is apt to break out later.

Dr. Graham says in most cases where it is gone far enough you need to have X-ray work, but in all of the cases where there has been an abscess, it seems the only thing to do is to fill all the root canal and fill it to the end.

**Dr. S. M. White:** I enjoyed the paper very much. I think it has been worth my time and money to come up here and hear such a paper. I believe in the thorough work Dr. Graham advocates in the treatment of abscessed teeth, in thorough work, that is not patching up a part here and there and taking chances on the balance, etc., then let them go. I don't believe in that kind of business.

Pyorrhea is generally treated and cured by thoroughness and in taking care of cases of that kind I believe in the proper thing, and I believe the only thing to fill a root canal with is gutta-percha. And the man that says he fills every root cavity to the apex and looks wise is mistaken. He may think he fills them, but he doesn't fill them because the slides show that about 80 per cent. are not filled. I hope this work will go on and that before very long we will learn just how to take care of these teeth so many more root cavities will be filled.

# THE TRUE PHILOSOPHY OF MASTICATION AND INSALIVATION

BY MERRILL HOPKINSON, D.C.D., A.M., M.D.

PROFESSOR ORAL HYGIENE, UNIVERSITY OF MARYLAND.

As a fair index of the lack of proper interest in the propaganda for correct mastication and insalivation upon the part of the average professional man, I propose herein to comment briefly upon an article by Dr. George M. Niles, a physician of Atlanta, Ga., bearing the title, "The Philosophy of Mastication," which appeared in the Journal of the American Medical Association under date of March 29th, 1913.

The editor's assistant informs me that Dr. Niles "was making a protest against the abuses of Fletcherism," and published the article with that in mind, and declines to publish any comment upon it.

From my point of view the ideas of both author and editor are vicious in principle and calculated to do harm, particularly at this time, when a mighty effort is being made to extend the beneficent teachings of oral hygiene, of which properly prolonged mastication and insalivation form so important a part.

The columns of a scientific journal are not intended to reproduce the fanciful whims of a suppositious joker, more especially when he makes a weak attempt, in this way, to discredit the valuable teachings of so able a man as Mr. Horace Fletcher; if, however, the statements of Dr. Niles serve to stir up the ever-increasing host of men who believe in and teach thorough mastication and insalivation for all human beings, as they have the writer, the article may serve a better purpose than I was willing, at first glance, to accord it, and I shall hope it will have that effect upon all who read it.

It is not easy to comprehend the basic reason for either the writing or the publication of Dr. Niles' paper, the reason assigned by the perspicacious assistant to the editor of the journal to the contrary notwithstanding.

Dr. Niles admits that tachyphagia "is a frequent fault, and has no doubt caused many digestive squabbles, besides being the starting point of many chronic disorders of the alimentary tract." If he does not know that it is the great American crime against hygienes, and the cause of ninety-nine one-hundredths of all digestive disturbances, he is an extremely poor observer.

It was not necessary for him to decry "the necessity of slow and deliberate mastication," for this is not a necessity if any given individual is able to perform this art properly in a hasty and incautious manner.

Mr. Gladstone, of whom he writes, "as the first to advocate this fad in England," was one of the giants of his time, and perhaps as great an observer as the world has ever known, and he found it desirable for *him* to chew each mouthful of food thirty-two times.

Mr. Fletcher's personal demonstration will always live as the greatest argument for the proper use of the oral equipment, and flippant writings will not change by one jot or tittle the results of his experiments.

Whether we agree with all the so-called Fletcherisms is immaterial; the fact remains that he is the greatest living exponent, so far as published writings can testify, of the value of a good oral equipment, plus properly prolonged mastication and insalivation.

The family of the writer asseverates that he chews water. It may be so. I certainly make an attempt to chew milk, and if water should be masticated, it most certainly would not pass from my mouth without proper attention.

Since I have known the value of the philosophy of mastication and insalivation, obtained through the knowledge of all the phenomena relating to the duties assigned the oral cavity, in its share in the great chemistry of ultimate nutrition, I have been spared many of the digestive horrors of early life, when my habit was to bolt my food, illy prepared to pass into the stomach. An extraordinary argument presented by Dr. Niles is as follows: "carnivorous animals and reptiles habitually bolt their food, and zoologic history furnishes no record of any psychic forms of dyspepsia in these creatures."

I am not prepared to present specific evidence showing this statement to be incorrect, but I doubt it very much. It is true that certain creatures are so constituted by nature that their natural habit is to bolt their aliment; but, as we are dealing with the human animal, it matters little, or not at all, whether carnivora and reptilia do, or do not, suffer from digestive disturbances.

It is certainly true that a wise creator gave to man twenty out of thirty-two teeth for distinct purposes of proper trituration, and if said man follows the example of dogs and snakes, he is quite sure to come to grief.

It is incredible that any thoughtful, scientific man should fall into so grievous an error as that of Dr. Niles, as expressed in his conclusions regarding the case of a "cadaverous looking dyspeptic," cited by him.

It seems to me that a fairly talented medical sophomore would at once see that this man's wretched condition was nature's final payment, long deferred in his case, for a persistent violation of one of the inviolable laws of oral hygiene; and neither due to his late awakening to the proper use of his mouth, nor following the counsel of "an over-zealous friend," who had advised him to "properly masticate his food." The latter propositions are unthinkable and absurd.

The mental attitude is, of course, a great factor in the digestive process, but it matters not how many "wireless messages" may be sent to other parts of the alimentary tract, the great function of nutrition cannot be accomplished, in the vast majority of cases at least, unless the contributing functions of the dental and salivary glands have done what is required of them, at the commencement of this wonderful process.

It is one of my useful duties in life, to try and teach the students in the University of Maryland the value of the proper use of the mouth, in relation to the propaganda of oral hygiene, from every known point of view; and the levity of Dr. Niles' paper, which might prove an incentive for thoughtless persons to follow his ill-advised concepts, moves me to make this plea to all professional men, and through them to their families, friends and clientele, not to take a backward step in this important function, but to try and teach all mankind the absolute necessity for properly prolonged mastication and insalivation.

Let me assure Dr. Niles, and all of my medical brethren, that "a simple injunction as to good teeth and mastication" is *not* sufficient for "a majority of every-day Americans."

Dr. Niles is evidently unaware of the fact that careful examination of the mouths of our public school children, in many of the great cities of our country, shows dental defects in over ninety-five per cent. of all those examined.

It can be readily understood that because of this condition, bad habits of mastication are all too universal, beginning at an early age and continuing throughout life.

The natural sequence of such habits is all forms of indigestion, malnutrition, retarded development, both mental and physical, and a long chain of evils, all of which can be avoided by giving proper attention to the oral equipment, and by using the gateway of life and health as a wise Creator intended it should be used. In all cities which have established oral clinics in the schools, either by individual orists, oral society subscription, or by municipal enactment, properly prolonged mastication and insalivation are among the first lessons in our oral hygiene propaganda, and it would be a crime for any man, or set of men, to hinder the advance of this beneficent and widespread teaching of the present day.

If the views expressed by Dr. Niles are held by any number of medical men, although this does not seem possible—and yet, by reason of the pressure and uncertainties of our vocation, I know we frequently violate many hygienic laws—I would earnestly urge all such to go deeper into the study of the subject, consider the lamentable conditions of the mouths of the great mass of our school children, and of the adults as well, and the incalculable benefits which may be derived from conservatively removing the awful handicap to their growth and progress, and by teaching them the manifold advantages of properly prolonged mastication and insalivation.

Permit me, in conclusion, to re-paraphrase a well-known and truthful saying, by adding a few necessary words to the paraphrase by Dr. Niles:

"No man can, by taking thought, add energy to his stomach" or alimentary canal, except by a proper use of its first three inches.

413 Professional Building.

The man who spends all he makes living on the principle that "We are dead a long time," may one day find to his sorrow that we oft live a long while, and that as age advances one's earning ability lessens.

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Debt is like riding on a toboggan slide; it's a cinch going down, but the coming back gets your wind.

# CROWN AND REMOVABLE BRIDGE WORK.*

BY DR. P. A. GOULD, GIBSONBURG, OHIO

*(Continued from page 710, September Summary)*

## OPERATIVE AND PROSTHETIC WORK

What is to be said on this subject will be a description of the easiest way to accomplish work that is practical, simple, and does not cause too much irritation from mechanical work in the mouth. The writer is convinced, as are many others, that a tooth may have its usefulness destroyed by too many unnecessary treatments, and too careless operation. The preparation and filling of the root canals is a very important operation, and should be properly done; but for lack of time and space we take the next step, that of grinding the tooth for a crown; then describe the making of a gold crown; next the making of crowns for removable bridge-work.

Nature provides gum tissue in the approximal spaces, and whenever this tissue is injured, it causes the loss of that much of it, and as dentistry has found no way to restore it to its normal conditions, the operator must be very careful not to injure it when cutting and grinding the tooth. Pyorrhea pockets are very often formed by the injury of operating, followed by the use of the toothpick, to remove food that has collected in the space caused by the loss of gum tissue.

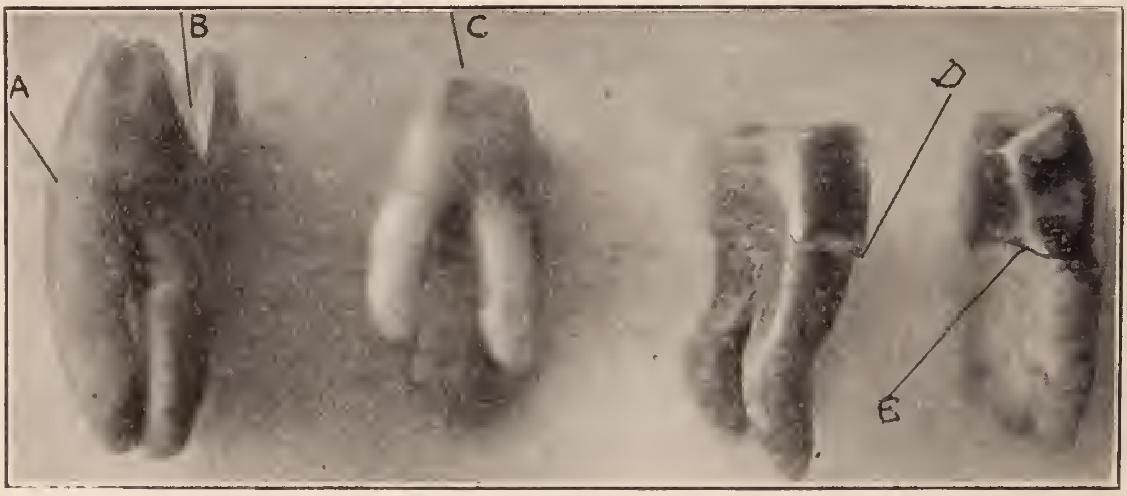

Fig. 7

The grinding of a tooth should extend as far as the cervical line (Fig. 7 at A), if this line has been destroyed, or the attachment of the peridental membrane has receded beyond this point, a new cervical line must be established that will correspond to the attachment of the peridental membrane in the changed condition.

It is much easier to grind a tooth and remove the enamel in the approximal spaces and not injure the gum tissue, by starting to grind at the mesio and distal pits back of the enamel. The knife edge of the carborundum disk, which should be used in grinding, will form a V, the angle of which should extend to the cervical line (Fig. 7 at B); done in this way the enamel can be removed without injury to the gum tissue or the approximal teeth; though it may be necessary to cut the gum at the buccal and lingual line this will heal and cause no trouble afterwards.

When the mesio and distal cuts are made as above described the tooth will have the form of a wedge; by reducing the buccal and lingual sides it will then have the form of a pyramid (Fig. 7 at C), the point of which has been ground off to make room for the occlusion; the corners are rounded off with some carborundum rubber disks used in a contra angle hand piece; it is easy to reach them.

The next step will be to get the exact measurement of the tooth at the cervical line; the length of this line will be the outside measure of the finished crown at this point. To cut the gold band make it a little short at this point, while at the morsal edge make it a little longer to allow for contouring; so the cervical edge of the band is not changed any in doing this, after the band is soldered. Take the file and bevel the inside of the band to fit the taper to which the tooth has been ground; set it over the tooth and it may be pressed to the cervical line and not go beyond this point, provided the measure taken was correct; if it hurts the patient it is because it goes beyond this line at some point, which must be trimmed, or the band is too large; correct before going farther.

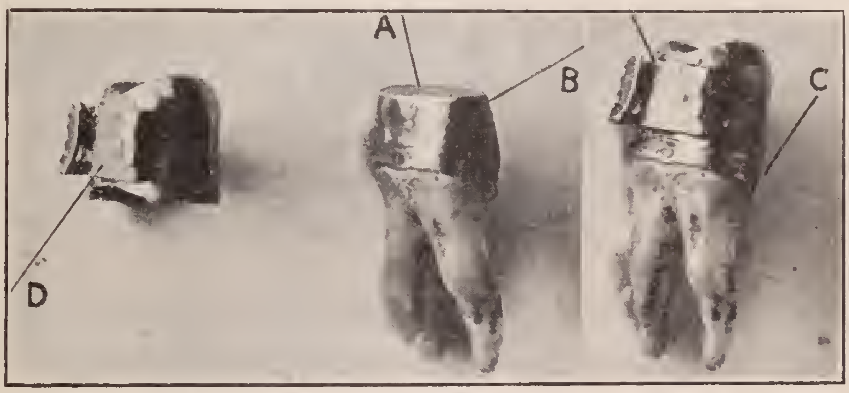

Fig. 8

The outside of the finished crown of a tooth should form a continuous line with the root of the tooth (Fig. 7 at D and E); at D the inside of the crown is as large as the measure of the cervical line and the crown may be pushed beyond this point, as is shown in Fig. 2 at A, of a molar crown in the first part of this work. E in Fig. 7 shows a crown with a correct adaptation to the tooth, the outside of the crown being continuous with the root of the tooth will cause no irritation or be the cause of foci of infection.

In forming the crowns for removable bridge-work the same method in grinding teeth and fitting crowns to the teeth must be observed, there must not be any irritation to the peridental membrane. The crowns that cap the teeth must be made of 28 gauge 20K gold plate, made in the form of a cone. (See Fig. 8 at A). To make these and have them uniform it is best to form them over a tapered cone of steel made of ¾-inch steel shafting 6 inches long, turned and tapered to one end as small as center of lathe will allow.

When all crowns are made over a definite taper there is no trouble in getting the taper all alike. The top crown should be made of 26 gauge 20K gold plate; the measure of the band is taken of the small circumference of the crown on the tooth (see B, Fig. 8), this is the inside measure of a cylinder-shaped band, which should be made long enough to trim so as to articulate with the occluding teeth. File the band or cylinder on the edge, that is to fit over the base crown on tooth, on the inside to a feather edge, shape over steel cone until it fits the base crown. (See Fig. 8 at C).

If made of 26 gauge gold there will be very little taper or spread to the crown that will appear on the outside of the top crown. The base crown should always be made short enough so that there will be a space between tops of the two crowns when fitted together. All pressure must be brought to bear upon the tapered sides of the base crown; allowance should be made for the top crown to settle over base crown and not cause pressure to come at any other point; it must be trimmed above the gum line so as not to come in contact with it. Vulcanite attachments are made to top crown by soldering a piece of 26 gauge gold plate over the joint of the band to strengthen it and at the same time form the attachment by turning the ends and punching holes in them to hold the rubber. (See D, Fig. 8).

A removable attachment of this kind will take the force of the strain given to it and distribute it evenly over the whole tooth. Also any rocking of the saddle on the alveolar ridge will work the top crown on the base crown in the same manner as a ball and socket would allow for this motion and not rock the tooth in its socket, as any solid attachment soldered to the crown, cemented to the tooth, would do.

In some cases this little rocking may not cause any harm, as the support of the ridge may be such that it is very slight, but in other cases the effect would prove very different. Always take plenty of time to do the work of preparing the teeth; if the teeth are sore allow them to heal before the crowns are put on them. When this kind of a double crown has been completed it is not in the strict sense of the word a telescope crown, it is what would be called a chuck crown. The construction of a chuck crown is such that it accommodates itself to all variations that are required for the attachments that it is used for. These attachments will fit better after they have been two or three months in the mouth.

Much care must be taken in getting impressions. No loose teeth should be pushed in the least one way or the other in taking them. It is best to use soft plaster in connection with beeswax. If the teeth crowned are a little loose and are moved a little in taking the impression it is impossible to get good results from the work. The writer has had experience of this kind when impressions were taken with soft plaster and much time given it to set, the work following was successful, causing the loose teeth to become solid in their sockets, supported by the work in their normal position. After taking the impression the procedure is the same as in partial plate work.

A suggestion may be offered in the making of gold bars, which is done by casting; extensions may be made on a cast bar, and make the work stronger. (See Fig. 9 at A). A lingual bar is cast so as to form part of the saddle and with the extension holds the four incisor teeth. A full lower set (B and C, Fig. 9) in this case is given the patient with only four teeth, a cuspid and three bicuspids. All cases shown in this work are taken from some that have proved successful with more than a year's use. The case here shown in Fig. 9 has been in use four years at the time of this writing.

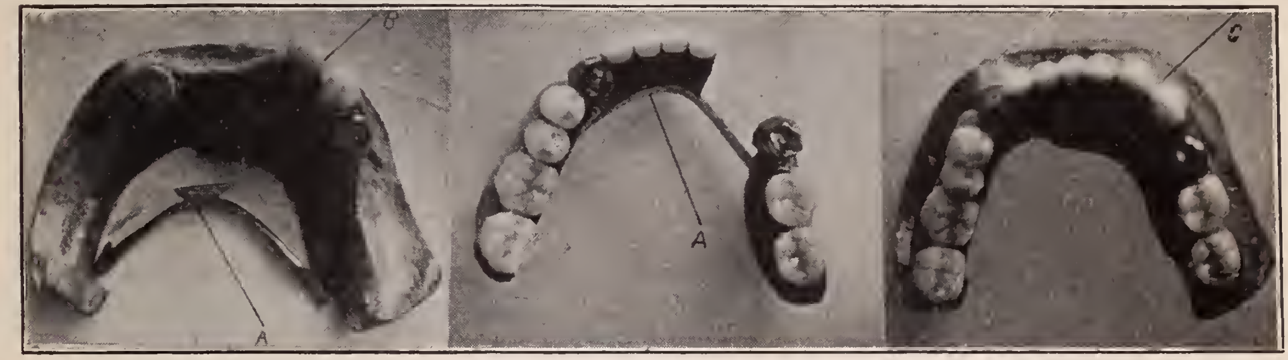

Fig. 9

Fig. 10 shows an upper case where the posterior teeth to a second bicuspid on one side, and the anterior teeth to a second molar on the opposite side are filled in by attachments to the aforesaid teeth in the mouth. Note the bar forms an X with the crown attachment across the roof of the mouth. Relief must be given for a bar from the roof of the mouth, so that the absorption which takes place will not cause it to rock on the median line or press too hard into the mucous membrane.

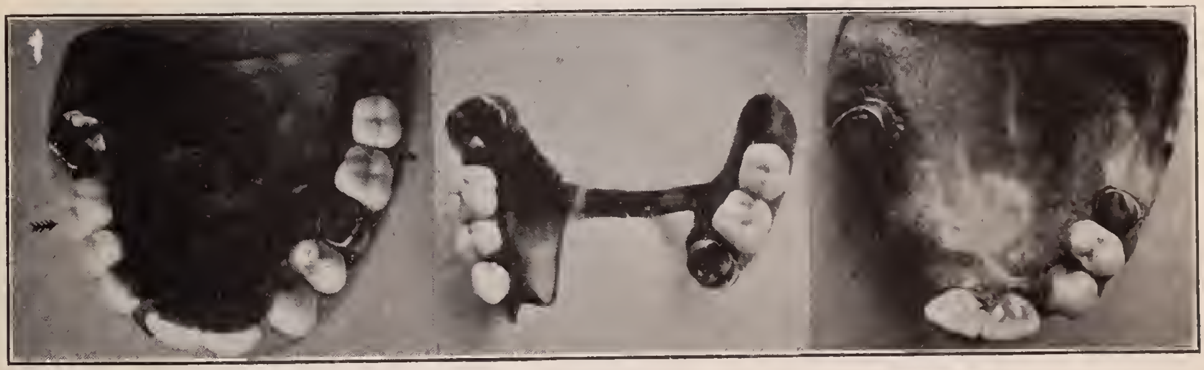

Fig. 10

Fig. 11 shows how the superior anterior teeth may be bridged from as far back as the first molar. In this case much pressure must be brought to bear upon the anterior ridge, and as the absorption takes place here it may be necessary to fill in on the saddle, so as to hold it in its proper place. One case is shown here in Fig. 12, where a superior bridge is put in on one side with the anterior and posterior attachments; upper and lower incisor bridges of this same description might also be shown, but one more that was a practical case is shown in Fig. 13. A superior cuspid was used for an attachment for a lateral and a bicuspid. The cuspids coming in at the lingual approximal space of the lateral and bicuspid caused an absorption of the roots of the latter, which required them to be extracted. A tapered square crown was made for the cuspid and a chuck crown made in this manner prevented the rotating in connection with the ridge and the central and second bicuspid. A model is shown of the cuspid crowned and also of the mouth before the lateral was extracted.

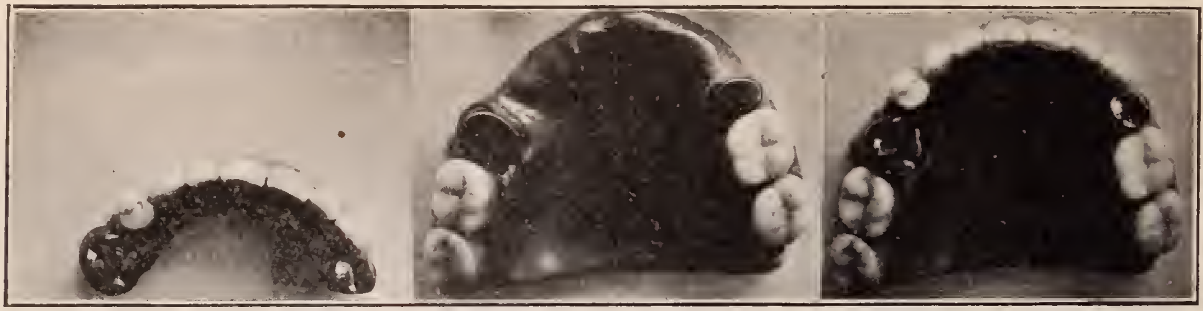

Fig. 11

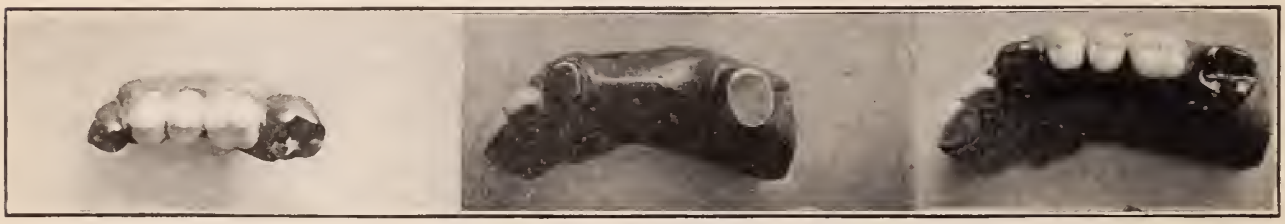

Fig. 12

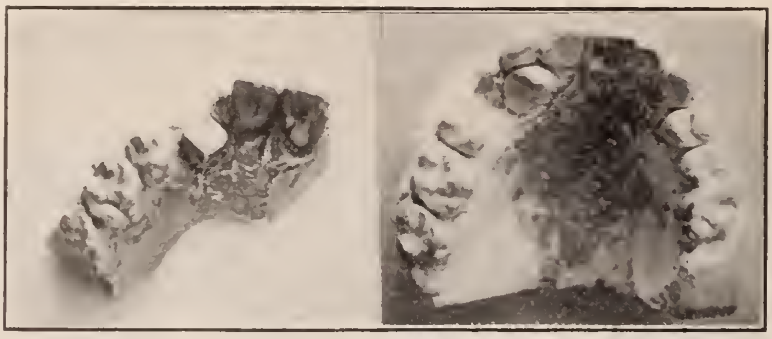

Fig. 13

The sad mistakes of yesterday can be buried and forgotten by the good deeds of today.

The road of "Nothing ventured, nothing gained," is paved with failures and mistakes.

# THE DENTIST AS THE PATIENT SEES HIM*

BY G. E. HARTER, TOLEDO, OHIO

SINCE I AM NOT A DENTIST, yet spend every hour of every working day in the year in immediate and intimate contact with dentists and things dental, functioning, as it were, in the dual consciousness of the dentist and the patient, it is, perhaps, possible for me to see with rather unusual eyes some things that members of the profession cannot be expected to see, and that the ordinary layman might see every day of his life without knowing that he saw them, and without the slightest comprehension of the meaning that should attach to the things seen.

To "see ourselves as others see us," especially if those others are able to fellowship with us to the extent of being unprejudiced, is, and always has been, a "consummation most devoutly to be wished" by all men who are earnestly striving to "do all the good they can, to all the people they can, in all the ways they can," not living and working merely for self-gratification.

Knowing dentists as I do know them; thinking, feeling and living with them and trying to enter into their thoughts and appreciate their needs as I do, it is possible that I may be able to "hold a mirror up to nature" in a sympathetic and helpful manner, without giving offense, without so much as grazing tender sensibilities. Such, at least, is my hope and purpose; if I do touch the quick here and there, it will be with no intent to wound, but to remedy, to heal.

I have not written for the fun of doing it; nor do I care more than the average man to hear the sound of my own voice; but I was more than willing to try to do something for my friends in the Northern Indiana Dental Society, especially since so many of them have shown themselves friendly to me on more than one occasion—even upon a certain occasion when I dared to contravene tradition and common usage in declaring against the excessive use of common salt in foods, among many other things, when I was accused of contradicting the laws of God for our guidance made and provided. I might say that I am wholly in accord with that other command of Jehovah against the eating of pork, and I dare to express the wonder if my critics on that former occasion are as heartily in accord with that one as they are with the regulation concerning the use of salt. If the truth were known, it seems probable to me that most of us would be found obeying the laws that suit us, leaving to others to obey those that do not please our taste or convenience. Carlyle, you know, understood this phase of human nature so well that he summed up the whole situation in a phrase, declaring: "The only laws that we should obey are the laws that we needs must obey."

If the reading of this brief paper produces as many and as satisfactory results as the former one has done, I shall be amply satisfied. Many of my friends in the society have come to me and have voluntarily expressed their gratifying improvement in health since adopting, even in a modified degree, the diet recommended, which, by the way, was far more comprehensive than the mere elimination of salt, although that seems to have been the part giving greatest offense, the one bone of contention.

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*Read before the Northern Indiana Dental Society, 1912.

It would seem that nothing could be quite so helpful as to know how we are regarded by other people, especially when our livelihood, and, far more worthy of consideration, our helpfulness in the community, depend upon that regard.

There are, of course, as many kinds of patients as there are dentists. The great law of affinity, of natural selection, operates here as elsewhere. Each class of patients will naturally drift to that class of dentists to which it belongs; levitate or gravitate, as the case may be. There are twenty-five-cent dentists and there are twenty-five-cent patients; equally there are five-dollar dentists and there are five-dollar patients. Of course the quarter-dentist never for a moment entertains the faintest hope of attracting a following from the five-dollar class of patients; and it is equally impossible for the five-dollar dentist to build up a practice among the quarter class of patients; and, if I know my dentists, none of them wants, or, at least, none particularly yearns for the quarter class. "Birds of a feather flock together," however; and the only way to get out of a class is to change your feathers.

But, in this case, "feathers" must be understood as implying far more than mere outward appearance; the nature and methods must be changed through and through. The boor cannot become the gentleman by changing his hat; nor can the gentleman be for long disguised by shabby clothes and poor surroundings. But the nature is susceptible of change from center to circumference. Man is not limited by his environment, nor yet by his habits—not even by his "nature," as that word commonly is understood—rather misunderstood. Man has within him the power infinitely to transcend all limitations, to rise superior to all obstacles: and, by opposing one habit of thought to another, developing himself to any height within the limits of his will. I wish to be clearly understood here. I mean to say that the will of man is limited only by its own operations. Each of us may be and can be all and everything that he wills to be. To know what he wants, to will to reach for it, and to dare to take it—this is the formula of progress and achievement. Each of us is the founder, the builder and the finisher of his own destiny. Each of us has the power perhaps unknown to himself to make or mar the present and the future.

Therefore, if your clientele does not please you, change yourself and change your clientele by so doing. Make yourself a five-dollar man and the five-dollar patients will flow to you as filings to the magnet. Of course, you will understand that I am using the terms "twenty-five-cent patients" and "five-dollar patients" only figuratively. I hope there is no class lower than the quarter class; but I know well that there are many classes above the five-dollar fellows; probably not in the smaller places; but what I mean is the highest and the lowest classes of patients in contradistinction with each other.

In one particular the dentist is peculiar among professional men: he comes into more intimate, personal, long-continued bodily contact with his patrons than any other; his personal appearance and habits count far more heavily for him or against him than those of any other business or professional man. I know of men who are ready to fight if another man, especially a stranger, so much as lays a hand upon his shoulder, even though in the most friendly way; they simply despise the touch of another's hand. When we consider that many women and not a few men have an innate, persistent and almost ineradicable antipathy to personal contact of any kind, we may realize the degree of confidence that frequently grows up between the dentist and his patient.

Like seeks like always, especially in human association and relation; and you will do well to learn, from the skillful and discriminating hostess who selects her guests with relation to their compatibility, that you cannot fill your reception room with too many or too widely diversified classes. People who meet each other in your offices should not be of too widely antagonistic or irreconcilable characteristics—what is more, they will not be for very long. If you try to cater to all classes, you will find your practice seeking its level, and it always seeks it downward, never upward. The upward step is always a lift; never a glide. If you would have your practice advance, you must advance YOURSELF and carry your practice with you. YOU are the *vis viva;* you are the motive power. Whether consciously or unconsciously, we attract to and attach to ourselves those of our own class. The higher we advance in individuality, civilization and real refinement, the higher and better will be those that come to us and remain with us.

The dentist who cheapens himself, who lowers his own dignity and that of his profession by uncleanly habits, by slouchy, outworn, ill-fitting clothing; by unnecessary and unprofessional familiarity; whose office looks and smells like the last rose of summer after frost has touched it, which ought to be left to bloom alone; whose chair and other paraphernalia are relics of prehistoric antiquity; whose bracket table advertises itself as a nest of germs; such a dentist may be able to perform an operation skillfully, may be the best prosthetist in town, but only dire necessity can drive to him the kind of patients he wants, the kind that you all want.

The dentist who craves a refined clientele must show himself able to appreciate refinement by at least outwardly assuming it. Assume a virtue and you will soon grow up to it. There are all degrees of refinement, and the higher we go up in the scale the better the class of patients attracted and the higher the fees. I do not mean that high refinement always is associated with a fat bank account; but I do mean that people of refinement appreciate good service and are willing to pay for it, whether the bank account be fat or lean. Neither do I wish to imply that a fat pocketbook always flies open gladly to recompense able services. We all know that this is not the case. We do know that appreciation grows with refinement; and that fees grow with appreciation.

Many dentists who are not guilty of the esthetic and social sins mentioned above, still lack in many ways that delicate sense of consideration for others that should mark the man who comes into close personal contact with other men, and especially with women. Please consider the closeness of the physical contact that your profession makes necessary: the lover-like attitudes, the intimacy of the long operation; and then resolve that never again will you go to your chair reeking with your matutinal pancakes, broiled beefsteak and coffee, or with the odors of celery or highly-flavored soups hanging about you. No woman of refined sensibilities possibly can go through such an ordeal without repugnance, and there are not a few men who would echo her disgust. An aching, sensitive tooth never yet deadened sensibilities, nor increased patience. Avoid these things.

Dentists who use tobacco cannot be too careful in its use. Smokers should carefully clean and deodorize the breath before going to the chair, and should wear at least a coat not worn when smoking. Better do your smoking after office hours. Chewers—well, I trust there are none among you: but that there are chewers in the profession I know to my cost. Yet it is quite possible to make even this habit inoffensive. I have a friend who chewed tobacco for twenty years, during the entire life of his wife, without knowledge of his habit reaching her. If that is possible, there should be no great difficulty in keeping similar knowledge from your patients.

The dentist's hands are wonderful things. I doubt if men of any other class on earth have brought their hands to such a perfect degree of training. But skillful though they may be, capable of almost impossible things, they must be the very acme of dainty cleanliness as well as marvelous efficiency, or the dentist will suffer.

The hands must be washed, washed, washed and washed again. The surgeon with his multitudinous ablutions and sterilizations should not be able to look upon the dentist as less careful than he. Wash upon every possible pretext, and do not hesitate to permit your patients to know that you are doing so. Nothing can impress a patient more than to perceive your care in this regard. Conspicuous cleanliness has an advertising value that every dentist should capitalize.

But it is not enough merely to wash. Soap must be carefully selected for its neutral qualities. Never use soap containing animal fat, glycerine, or perfume of any kind whatever. Avoid soaps that leave any kind of odor on the skin. People of refinement prefer to use their soaps and perfumes separately. Some perfumes are decidedly distasteful to many, while it is hardly likely that any one odor can be agreeable to all.

There is a soap against which I wish to warn you. It is advertised and sold as aseptic and antiseptic, recommended especially for dental and surgical use; but no matter how good it may be, it never should find its way into a dental lavatory. When used, unless it is most carefully and repeatedly rinsed in hot water, it leaves behind a musty or musky odor. not unlike rancid cocoa butter, extremely offensive to delicate sensibilities. Use a pure Castile soap, imported if possible; rinse the hands well, and let the final ablution be a dash of alcohol. It evaporates quickly, leaves no odor, and is now known to be among the very best antiseptics. I recently read in a medical journal that it is now generally agreed that alcohol is the active germicidal principle in most if not all antiseptics.

Hands should, of course, be in perfect condition so far as the art of the manicure can make them. Nails and cuticle should be looked after most carefully.

Hairy hands are usually disagreeable even to men. Hirsute coverings may be marks of masculine virility and all that, but they should have no place in the operating room. However vain you may be of your Esau-like hands, sacrifice such adornments to the electric needle or some depilatory preparation. If you can do no better, keep the hair closely singed.

Bodily odors need not trouble you or your patients if you regulate your diet properly; if you don't, as it is not likely you will, certainly not so long as palate regulates pabulum, then you must depend upon bathing and odorless disinfectants and deodorants now obtainable almost anywhere, or one may be compounded at a cost of a few cents for a year's supply. Such odors never should be overpowered by strong perfumes. That remedy is worse than the disease. Perfumes are altogether out of place on a man's toilet table anyhow. A delicate sachet placed in the handkerchief box is the nearest approach to the perfumer's shop that any of us should allow ourselves.

Clean linen through and through is indispensable, of course. So is a clean, sweet breath. The long strain over a nervous, sensitive patient burns up a lot of your vitality, and the odor of carbon dioxide is unpleasant. Never use sen-sen or any other breath perfume. A small pebble carried in the cheek or under the tongue will keep the mouth fresh. Dr. Zarbaugh's All-In-One tablets are excellent. I use them constantly, especially after speaking. They are said to liberate oxygen; whether they do or not is not material; they are dependable as a breath-purifyer, and they have no odor.

I think we can well afford to dwell somewhat on this matter of the care of the hands. Dr. Ralph St. J. Perry, writing in a dental journal, says that since Lister's edict of cleanliness was promulgated so much has been said and written upon the rendering of the hands aseptic that many have overlooked one of the most potent factors in medical and dental practice—the ordinary care of the hands.

The hands should be clean, dry, warm, smooth and soft. Regardless of the standing of his patients socially, or his own position in the community, friends and patients alike should be able to testify to the fact that the dentist's hands possess those five qualities—cleanliness, dryness, warmth, smoothness and softness.

So far as the dentist is concerned, the possession of these five qualities does not imply effeminacy, but indicates compliance with the demands of his profession.

Dirt is simply matter out of place; and one of the conditions of our existence on earth is that the hands must of necessity become the lodging place for more or less of this wandering matter. Because of the peculiar nature of the dental profession, dentists' hands while required to be at all times immaculate, must, of necessity, come into frequent contact with many kinds of dirt unknown to the average man.

Dr. Perry says that warm, soft water should be used in cleansing the hands. If not obtainable, hard water that has been boiled for half an hour, or to which a little borax or ammonia has been added, is the next best. We all know that the solvent property of water is greatly increased by heating. Of course, only purely vegetable soaps should be used. Dr. Perry recommends those of which cocoa-butter is the fatty base. While I prefer olive oil, there is no objection to cocoa-butter, provided a soap can be obtained containing that substance in a sweet, pure, fresh state, untainted by rancidity. The soap must be hard, white, as nearly odorless as possible, and one that will lather freely in either hard or soft, warm or cold water. A lather is necessary to the removal of dirt, and is especially requisite in soap intended for the removal of the peculiar forms of dirt to which the hands of dentist and surgeon alike are susceptible.

There are two best times to wash the hands; just before examining a patient and just after. Washing the hands before the examination is for the protection of the patient; the washing that follows the examination is for your own protection, as well as for the safety of others with whom you come into contact. The constant repetition of this practice is beneficial, is certainly perfectly harmless, while its psychic effect upon patients and others who may witness it is sure to be beneficial.

In washing the hands do not merely dip them in water and wipe the dirt off on a towel. Take off your coat, remove your cuffs if you wear them separate, pull shirt and undershirt sleeves up as nearly to the elbow as possible, and wash well up the forearm. Never mind the lady who, in preparing for an evening function, asked her husband whether she should wash for a high-necked or a low-necked dress. Always wash as though you were about to insert the entire lower arm into the mouth of the patient. Never permit your patient to see a little dark blue line at the wrist. It is a sure indication of slovenliness if not of uncleanliness. Wash the dirt off into the water—all of it. The towel is intended for drying purposes, not for the forceful removal of dirt.

Towels should be of a very absorbent material, and should be thick enough to accomplish that purpose thoroughly. The paper towel, recently introduced, is as good as any cloth towel, and is cheaper, when laundering is considered, while its use is sure to have a good effect upon the mind of the patient, insuring him against the possibility of contamination that might result from the repeated use of a cloth towel. Of course, there may be little or nothing in this as a matter of fact; but the impression is sure to be good. Even though you use a cloth towel but once, the patient cannot be sure of that, while a paper towel, deposited in the waste-basket, is plain evidence that it cannot be used again, while, being torn from the roll in full view of the patient, he must be satisfied that it has not been used before.

The hands must be dried as carefully as they are washed. A little more care than is absolutely necessary is advised. Wipe all the joints and the clefts between the fingers with special care. Imperfectly dried hands become red, rough, chapped, and are subject to infection, particularly susceptible to eczema and other skin diseases.

If you ride horseback or a bicycle, run an automobile, or use the street cars, you should wear gloves suitable to the occasion. This is not at all an affectation, but is necessary to the preservation of the cleanliness of the hands, while it possesses an undoubted advertising value that cannot be neglected by ethical men.

I have spoken of the care of the nails and the cuticle surrounding them. Dr. Perry lays great stress upon that point also. I also have spoken of bodily odors with reference to the dentist. Dr. Perry devotes considerable space to a consideration of this subject with regard to the patient. The aroma rising from the patient may be of perspiration, pus, or any odoriferous secretion, and the dentist is sure to become more or less charged with it. It sometimes has a tenacity that defies the most frantic washings and scrubbings, no matter how often repeated. Of course your imagination may have something to do with it. but to you it is reality, and must be banished before you can comfortably approach another patient, meet a friend or go home to your family. I give Dr. Perry's treatment for this annoying condition:

Wash the hands thoroughly in warm water, using soap enough to produce a good, stiff lather; then wash in a solution of cyanide of mercury, 1:1000. Dry the hands THOROUGHLY; then rub into the skin a few drops of pure balsam of Peru. This will yield a pleasant, vanilla-like odor, and thoroughly mask the offensive smell. If necessary to leave the office at once, a toilet cream, made of casein, without grease, perfumed with oil of rose, may be applied. But always use the balsam of Peru. It is not only deodorizing, but antiseptic and healing as well.

The same method may be employed for overcoming the odor of iodoform, carbolic and other solutions, and all odors of unpleasantly odorous drugs with which the hands are certain to come into contact.

Bleach out iodine stains with a ten per cent. solution of sodium hyposulphite; those of corrosive sublimate solutions by repeated washings or rubbings with a fairly strong solution of table salt, followed by inunctions with lanolin. Permanganate stains vanish upon application of a not too strong solution of oxalic acid which has been slightly acidulated with sulphuric acid.

Some of us are afflicted with excessive perspiration at all times, particularly in summer. The moist hand is nearly always a cold hand, and you know by experience the effect of contact with a cold, clammy hand. The warm, dry hand is certainly an asset in your field, and simply must be cultivated. If your pores are too large, use astringents. If you know that your hands are cold, as you can ascertain by touching them to your cheek or neck, hold them in a bowl of hot water for a few minutes, and then dry them thoroughly. Be sure they are both warm and dry before touching your patient.

Dentists depend upon the tactile sense more than any other class, not excluding the surgeon. Quite apart from all esthetic considerations, the smooth hand is a much better tool than the rough one. Callous spots may be removed by applying salicylated flexible collodion. In a few hours the calloused cuticle may be scraped away. Repeat as often as may be necessary—but get rid of that callous! The same treatment will be found efficacious in removing all forms of warts. (Imagine a wart standing out aggressively upon the finger about to be inserted in your patient's mouth!)

Of all attractive qualities that go to make up the successful dentist none is so effective as the gentle touch. The dentist who is rough in his operations may do his work well, but he is laboring under a tremendous handicap that is sure to operate against him more and more as the public becomes more and more educated along dental lines. Roughness and delicacy of touch never are found in the same pair of hands. Dentists who have cultivated the gentle touch are usually also very successful in the financial touch.

The public is rapidly being educated to regard the dentist as a specialist in medicine, and you should all aid in this education by your personal attitude toward the public.

Quite recently, in the line of my duties, there came to me a most excellent paper, written by a friend of mine, dealing with the duty of the dentist to the public in a broad way. With one part of that paper I must disagree. The writer implied that dentist's bills should be based in part upon the cost of the materials used.

However admirable such considerations may be viewed from the standpoint of broad ethics, his conclusions do not at all agree with the professional attitude. They are commercial, rather than professional, as I see the matter. Here is just where the line is drawn between commercial life and professional life.

The professional man is a servant of the community; he yields personal services to society, and for those services he is permitted to live. He is not a merchant, buying and selling metals. In the old days, no physician or surgeon ever fixed his fees. He was made the recipient of an honorarium.

The business man, the man engaged in commercial pursuits, buys goods, adds to their cost enough to recompense him for his labor and expenses, and then loads upon them as much profit as the traffic will bear or competition permit. Ask a business man how much he aims to earn per hour. Well, he may not laugh at you; he may be too polite for that; he may even answer you, if his mind works quickly enough. If he tells you the simple truth he will say: "All that I can get." And this, quite regardless of any personal service rendered to the community. He is under no sort of obligation to do anything of that kind, and the idea never occurs to him. In his case, everything is based upon the cost of the goods, plus the expense of handling them.

It seems to me that dentists never should think of the cost of the materials they use, but altogether of the benefits they are rendering. It is also my idea that they should get away from the notion of fixed prices, or a fixed charge for services rendered. There may be a minimum fee, but the doors should be wide open in the other direction.

Some lives are worth more to the community than others; some individuals count for far more in the social scheme than others. Therefore services rendered vary in their value through the value of the individual to society, and should be compensated accordingly. What I mean to say is that an alloy filling placed in my tooth would be worth less to the community than it would be if placed in a similar tooth belonging to some other man, provided that man's life were worth more to the community than is my life.

That is precisely the basis upon which professional services are and should be rendered and paid for. It is the idea underlying the physician's charge, although, in too many cases, the pocketbook or the vanity of the patient has come to be the actual gauge.

I have the pleasure, I may say the honor, to be acquainted with the man who is considered by many fellow practitioners as standing at the head of the surgical branch of the medical profession in America, if not in the world. At least he is quite sufficiently famous to satisfy any normal ambition, and his opinions and services are sought far and wide. I have occupied a chair in his reception room, and have seen his assistant assess Madam Sealskin-and-Diamonds fifty dollars in advance of so much as seeing the inside of his consultation room, as a sort of retainer fee, as it were; and I have seen that same man charge Pat $3.50 for setting and dressing a crushed hand and attending him during a long siege, including the cost of making a skiagraph—just about enough to pay the photographer.

The point is that your services are worth, so far as you are concerned, just as much whether you use alloy or gold; but that your charges should be based upon the value of the services you render to the community. In thinking of the value of certain lives to society, we must, of course, remember that this is a commercial age; and I have had in mind only their value in a financial or property sense. Well I know that many poor men and women have a far higher value in the Cosmic Scheme on other planes than the Morgans or the Rockefellers; but you would have considerable difficulty in convincing the financial magnates of that fact. Some of them declare that the Almighty has made them the custodians of the world's wealth, and that they are worth in His sight more than a world full of Pats and Susans. Take them at their own estimate of their value, and charge for your services accordingly. But never bother your head about the cost of the materials you use.

Considering the use and cost of the various filling material, my idea is that the dentist should use that particular material that seems to be indicated by conditions before him; the material that will enable him to render the most efficient service. There is no doubt in my mind that alloy sometimes makes a better filling than gold—often it is the only material available. Since we are rendering personal services to the community and not selling goods, the result is the only thing to consider; why, then, should the cost of materials used be considered at all in fixing the price? Are the requirements in knowledge, skill, patience, nerve-force, kindliness and good-will any less for the treatment and preparation of a cavity for the reception of an alloy filling than for one that is to be crowned with gold? Sometimes yes, sometimes no, of course; but I mean necessarily, in the nature of things. I think the variations between gold and alloy are no greater than between different cavities that are to have the same kind of filling applied. Why, then, should the compensation be less? Are you rendering a lesser service to the individual and to the community through the individual by preserving his tooth by the use of alloy than you would by accomplishing the same result with gold? ''The play's the thing,'' not the puppets that walk through the parts. The preservation of the tooth by any means at all is the point aimed at, and constitutes the total value of the service performed.

I know that this may seem a strange doctrine to some of you, but it is the professional idea, and you all will arrive there some day; if not you, then your successors. Lack of education in the past, lack of training, the slow evolution of the dental profession out of the ''barbershop and blacksmith stage'' referred to by a learned judge in Massachusetts recently, in rendering a decision denying professional status to the dentists of his state, in the matter of privileged communication, is responsible for the unsatisfactory standing of the dental profession today. Ideals must be advanced, requirements must be enlarged and made harder and harder, until the student leaving college shall have earned his degree and his title and shall be proud of his acquirements.

Gold as an excuse for big bills has tempted many a man to step aside from the narrow path; and gold never could have won its way so conspicuously to the first rank among filling materials were it not for the vanity of some patients and the cupidity of some dentists, who were, unfortunately, in the *business* for all that they could get out of it, and not in the *profession* for all they could put into it in service to the community.

If I go to a physician suffering from arthritis, and he sends me to a dentist to have bad teeth treated or extracted, does he render a low bill or none simply because he gave me nothing but advice, and, possibly, the address of a dentist? Certainly not. His skill, knowledge, advice constitute the sole measure of value.

If he administer sugar of milk, or magnesia, or bread-crumb pills, worth, as a commercial proposition, only a few cents per pound, does he make a lower charge than he would had he prescribed chloride of gold? If he supply the remedies himself is his bill higher than if he merely write a prescription? So far as my limited experience goes the answer to both questions is, No. His charge does not rest upon commercial considerations in any form or degree. He is a professional man, and he knows it; he knows what constitutes a professional man, and he lives by that knowledge. His charges vary, but the variance rests upon quite another, quite a professional, basis; upon the VALUE to the community through the individual of the services rendered. Charity, of course, is quite another matter. We have the very poor with us always, and no class of men can point the finger of scorn at the dentist in this regard.

The growing tendency in the minds of the people to look upon the dental as upon the medical profession should be encouraged; but I do not agree with those who would make of dentistry an appendage of medicine; I think it ought to be the other way about, if at all. But that is aside from the question at hand—that is "another story."

A suffering man does not call in a physician and attempt to tell him what his trouble is and what should be done to relieve him. He asks him for help, and expects him to know or to learn the cause of his suffering and its remedy. I want to go to my dentist in the same way, and I do it. I never suggest extraction, nor treatment, nor prophylaxis, nor gold, nor alloy. I suggest nothing and do not expect to be consulted. The whole thing is outside of my province; my duty ends when I sit down, grip the arms of the chair and assumed a resigned expression: I expect my dentist to know, just as I should expect my physician to know—and he does know. If he didn't he would not be my dentist very long.

The dentist who impresses his patients with the idea that he knows what should be done, particularly if he stick to it and refuse to do anything different, occupies a position in the community equal to that of the physician and has no favors to ask of him nor of any one. A clientele so built up is dependable and will stick.

Whether or not dentists should charge for time devoted to appointments that are not kept by the patient is a mooted question, and one that each must answer for himself, applying here a little of the golden rule—and quite a liberal dose of the silver rule also, if the patient happen to be a valuable one. To me the idea smacks a little too much of the hairdresser and the manicurist. Be that as it may, dentists POSITIVELY MUST KEEP THEIR OWN APPOINTMENTS, not only with their patients but with everybody else in the community. There simply is no other way. Leaders in the community, they are more or less in the limelight of public criticism, and cannot afford not to merit the approbation of their neighbors. Especially is this true in small communities, where the dentist should occupy at least an equal position with the minister, the doctor, the lawyer and the school superintendent. These four should divide the care of the welfare of the community between them on a level basis, on equal terms. Neither should feel tolerance only toward any of the others, but should recognize the others as level-eyed comrades in the good work of evolution.

If you want to be respected (and a little feared, which is a good thing) in your community, you must make yourself different, make your individuality stand out from the crowd. Let your engagements and contracts be kept to the second and to the penny, if you expect your patients to keep their appointments and contracts with you. Make yourself known as models of punctuality. Then you can with good grace and some chance for success attempt to enforce a rule of equal punctuality on the part of your patients. Men are known for what they are, not for what they think that they are making other people think that they are.

Never permit your patients to wait for you. If you miss a meal occasionally all the better for you. We all eat a great deal too much anyhow. Most of us are digging our graves with our teeth, or with some other part of our anatomy. Even a day's fasting is no serious matter. Other people's time is worth as much as yours—maybe more; whether it is or not the other people pay your bills, and you cannot hope to build up a satisfactory practice while indulging in slipshod habits, morally, financially or physically. Be punctual with everybody, and punctuality means RIGHT ON THE DOT. You cannot keep a two-o'clock appointment at 1:45 nor at 2:15.

"Clean as a new pin" must describe the dentist, his office and everything in it. I have a relative who furnishes his house new from top to bottom, except books and other things having more or less sentimental value, every two years. He says that is the only way to keep clean. There may be something in this for the dentist who really wants a first-class practice among first-class people who can and will pay first-class bills.

Make yourself first-class dentists and first-class men; it follows then, "as night the day," you cannot long attract a third-class practice.

From the standpoint of the patient, dentists should at least prescribe, and I think, should also dispense, tooth-powders and mouth washes. There are plenty of good ones that no dentist need hesitate to recommend or dispense, many made by dentists who are conscientiously devoting their time to manufacturing chemistry, and none of you would be taking any chances in handling or prescribing their products. You can easily satisfy yourselves as to the respective merits of the various sorts offered, and your patients will thank you and pay you well for your trouble. You need not condemn any, but you can emphatically declare your preference for those that you think best meet the needs. These may be dispensed in plain packages if preferred.

If I were a dentist, I should include these items in my bills for Professional Services, not itemizing them at all, and I should get pay for my prescription as well as for the goods.

Simply hand your patient a package, as a physician would, and say: "I want you to use this; discontinue any you may be using and substitute this."

You are as greatly responsible for the health of your patients as is the physician, if not to an even greater extent. I think that every dentist should, and I believe that at no distant day every dentist will, understand microscopic and analytical diagnosis, and will so extend the field of his usefulness as to take advantage of his opportunity for early and complete knowledge of the physical condition of his patients.

"Coming events cast their shadows before;" in the case of human diseases, long before the critical stages are reached when help is problematical. I am told that cancer, that destroying wolf of diseases, may be diagnosed from mouth conditions in ample time to abort the operative stage, which usually comes far too late for effective treatment.

Of course, your patients do not come to you to have you read their physical horoscopes, but is that any reason why you should not take advantage of your really exceptional opportunities to render them such service as it is almost impossible to obtain elsewhere? If you knew of a pestilence raging in your neighborhood, would you pass it by because it happened not to be your specific or official duty to take cognizance of it? Surely not. Then why pass by opportunities for the discovery of a pestilence raging in the physical organism of a patient?

Surgeons complain that cases of sarcoma and carcinoma rarely come to them in time to avoid fatal termination. Very rarely is operative procedure permanently successful. Usually the result is only temporary, and death merely a question of time. An early diagnosis from the mouth might save many a valuable life.

I know you are not paid for doing such work, but how long would it be before you were, if you began the practice? How long would it be until you would be sought for to render this timely and effective aid to the physician and surgeon? Are you going to wait until the medical branch takes up your specialty for the purpose of diagnosis?

Don't stick too closely to the standard of precedent. Men in business are paid for what they know, and for the skill and daring they display in applying their knowledge to new uses. Strike Out! Don't fear to be a Christopher Columbus occasionally. When I think of the unexplored field awaiting the enterprise and good-will of the dental profession, I certainly could envy every member of it his opportunity to benefit his race and win lasting fame for himself.

I would like to know that every dental friend of mine had learned the secret of "painless dentistry." There isn't much to learn. I know a dentist, ethical to the last degree, who wouldn't advertise or do anything fernist the code, who is advertised by his loving friends to such an extent that he often is crowded to the wall with engagements; and all he does that other dentists do not always do is—he keeps his burs and other instruments SHARP. He has no fear of Painless Perkins or any other fake. Every one of his patients is a walking advertisement for him. Bring up the subject of dentistry almost anywhere in Toledo, and there is practically certain to be some one there who will speak right out in meetin' and declare that Dr. Jones, which is not his name, does not give them pain. I know one of his patients whose anterior teeth are as sensitive as the nerve of the eye. Prior to visiting this particular dentist, operations on his anterior teeth were dreaded and postponed as long as possible because he was certain of exhausting suffering. It is different now. Dr. Jones uses sharp burs. He has learned how to keep them sharp; and he also has learned to know when to throw away a bur and substitute a new one. He has learned that good burs cost less than patients.

I would have every dentist thoroughly alive to every opportunity. I would have every dentist troubled by that divine discontent that will not let us rest day nor night until we are doing all that we can for ourselves and for the world, instead of treading the weary mill of routine day after day. I would have the dental profession the one vocation in all the world that should be known for its vital activity along all lines of endeavor and usefulness.

Instead of being narrow, suspicious and contracted in their outlook, I would have the dentists broad, liberal, tolerant and truly educated. I am told that dentists do not read, do not study, do not even try to keep abreast of the times in any line except, possibly, their own profession. Dentists should have a dozen lines of intellectual activity. They should join or form literary clubs or societies; not among themselves exclusively, but taking in all; should be fully alive to all that is going on in the world; should be able to carry on an intelligent conversation with other men that they meet on every subject in which the world is interested. Spencer tells us that our position in the scale of human evolution may be judged by the number of subjects upon which we are able to converse intelligently; by the number of narrow prejudices that we have outgrown; by the number of lines of activity we keep up. I would have dentists stand at the very forefront of evolution, judged by these standards.

Avoid the smutty story, not because you are better than other men, but because better things are expected of you, and you haven't time nor mental energy to waste on such things. I remember attending a dental convention at which a professor in a prominent college read a paper. That evening that same professor gathered about him a group of younger dentists and regaled them until long after midnight with a series of stories that ought to have made a wooden Indian blush. Do not understand me as setting myself up as a pattern in any manner or degree;

but I am not a leader in my community—and a dentist should be; especially a dental professor. "Out of the fullness of the heart the mouth speaketh;" and certainly such an exhibition cannot be understood as proclaiming a high order of interior development.

Everything exterior, everything that we see of the man, is only a product in matter of the man inside. As character, so is conduct. I would have every dentist so live as to proclaim himself to the world as a character worthy of respect, of emulation, of confidence; I would have his walk and conversation so clean that no man need fear to trust his wife, his daughter—or that most precious of all possessions, his mother—in his hands.

May I add just a brief clipping bearing upon one of my hobbies? It is likely that some of you may profit by it.

Did you ever have "stomach trouble"? If you have not you have escaped one of life's most disciplinary blessings, for nothing so humbles one's pride, nothing so dissipates one's egotism, nothing so doubles one up, as it were, as a genuine and vigorous case of "stomach trouble."

The stomach is a large gunny-sack-like muscular pouch situated in the northern part of the abdomen, at a convenient location to catch all the sundry material of food and drink, including ices, pickles, pies, bologna and booze, and other junk consigned to it by the owner thereof.

The function of the stomach serves for many purposes, chief among which is that of a warehouse, junk-shop, groggery and icebox, although some of the highbrows would have you believe that it is supposed to be a place to digest nitrogenous foods, et cetera.

The stomach is the most patient and long suffering of any of the organs of the body, for it seems to stand for most any kind of treatment for a number of years before its patience becomes exhausted; you may burn it with mustards, chili con carne or hot tamales, you may scald it with hot soups and hot drinks, you may blister it with peppers, sauces and raw liquors, you may freeze it with ice cream, ice-drinks and ices, you may soak it with gallons of cure-all mineral-spring waters, or mistreat it by withholding anything but "nature's raw foods," you may souse it with patent medicines, or stuff it to standing-room only with a cheap restaurant bill of fare, yet it will uncomplainingly do its best until—alas! and alack! one day the worm will turn—one day its long-suffering patience will be converted into a long-suffering agony, and you will then begin to debate in your mind the negative side of the old, old question, "Is life worth living?"

If we could realize early enough in life that the purpose and function of the stomach is to digest a reasonable amount of properly prepared food in order that the body may be nourished, and could be made to understand that a high state of resistance to disease is only possible by having a properly nourished body, we might be deterred from misusing it as we do; but it seems that the experience of others counts for little, and each must go through his own life experience before he realizes that the stomach should be entitled to respect and kind treatment if it is to best serve its purpose, that of the chief nutritional manufacturing center of the body.

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### THE DENTAL DECALOG

After my paper had been forwarded to Dr. Gillis, copy of the July number of a medical journal came to my desk, containing "The Doctor's Decalog," which is so applicable to your profession that with the slight changes necessary, I pass it on to you:

1. Don't waste your time. Be doing something every minute. (But do not consider reading and study as a waste of time.)
2. Strive to make a good impression (by being a good pattern). Learn to talk well; be a man among men; dress well.
3. Be a courteous professional gentleman, but also a square-dealing and a square-deal-demanding business man.
4. Buy books; subscribe for the journals, read them and write for them. Attend society meetings, and let your voice be heard there.
5. Equip your office with every material thing that will increase your power as a conservator of human life and efficiency.
6. Don't be ashamed to consult with other men. Give them of your knowledge, and extract from them every fact of possible value to you. (In business matters consult some business friend. Dentists and school teachers own more bogus mining stocks than any other class, unless it may be the preachers.)
7. Be a real and not merely a so-called investigator. Take nothing on faith, but refuse nothing because it is condemned by others.
8. Make every case a subject for real research work, and leave no fact concerning it unknown that you are capable of uncovering.
9. Shun quackery, but study it; learn its strength and add it to your own store.
10. Wear no man's collar; let truth, honor and manhood be your only masters.

Most generally the knock of Opportunity is no louder than the brush of the bird's wings on the window pane; so sit up, look, and listen.

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To count on absolutely no one but self is the shortest road to success.

# IMPORTANT CONSIDERATIONS IN PROPHYLAXIS.*

BY J. P. CARMICHAEL, D.D.S., MILWAUKEE, WIS.

IT IS THE PURPOSE of this clinic, first, to show the primary causes that destroy the natural life luster of the enamel, and secondly to demonstrate the proper procedure in caring for the teeth that they will more effectively ward off disease.

You will find very few mouths in which the teeth are properly cared for, owing no doubt to a lack of understanding or knowledge of existing conditions.

I have selected to demonstrate my method of treatment, a patient with an exceedingly fine set of teeth; and I think that I will be able to convince you that certain conditions exist here, that may be well termed predisposing causes of disease.

By applying Dr. Skinner's disclosing solution, you find revealed here very distinctly the unkept surfaces, and as may be noticed, the surfaces receiving the stain most distinctly, are at the cervical margin and approximal spaces.

The adhesions here disclosed, and which were not visible before applying the disclosing solution, are placques (or scales) due to an exfoliation of gum tissue, and, which combined with food substances, form an invisible coating about the necks of the teeth not readily removed with the tooth brush. These early adhesions formed upon the teeth serve as a foundation for the accumulation of other deposits, until as we all know, that when these deposits remain, we have chemical and microbic action which not only produces injurious effects upon the enamel but causes the first infection noticeable in the primary stages of Pyorrhea.

Now that we have thoroughly dried the teeth, let us look a little farther in regard to the condition of the enamel surface and it is here plainly visible the effect of cleaning the teeth with harsh abrasive substances. This patient, being a Dentist, has tried, no doubt, many different dentifrices, and to make it perfectly clear to you, it is only necessary to dry the teeth to find that the luster or enamel gloss has entirely disappeared, leaving them far more susceptible to the adhesions of foreign matter. This case clearly reveals the inefficiency of caring for the teeth by means of the tooth brush and the application of those preparations that contain harsh or gritty substances.

The enamel of the teeth is extremely hard, as hard as glass. Its lustrous surface was intended by Nature to be so smooth that matter would not adhere, and when we resort to scouring preparations, I contend that we are doing more harm than good. To again smooth out the fine scratches or cuts in so hard a substance as the enamel of teeth that a shining surface may again be restored, has been a most difficult problem. This can only be done by a friction polish. In a friction polish we must have a powder in an impalpable form, possessing enough resistance when applied dry, to smooth the dull surfaces and gradually increase by degrees the brilliancy of the enamel. Nature's way of polishing the teeth is produced by the friction caused in the mastication of coarse dry food; so if we do not scour the teeth, the natural life luster can be permanently retained by giving the teeth a vigorous dry rub with a friction polish.

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*Report of Clinic at Ohio State Dental Society.

I have created a preparation, after much investigation along the line of restoring the real life luster to the teeth, upon which everything depends as regarding both health and appearance of the teeth. For the final polishing and to give the teeth a life-like appearance, I use this preparation, known as Carmi-Lustro, the base of which is a very light, impalpable powder, derived from calcining a combination of rare earth minerals. This powder possesses that rare quality of resistance, when applied dry, to create an extremely high polish upon very hard substances. This preparation is best applied by mixing with alcohol and drying the powder upon the teeth. The most effective way is to use the prepared cork wheel, gradually drawing the powder under the wheel, or, it may be applied by filling a cup shaped brush wheel, and using a high speed to the dental engine, which produces enough friction to restore the beautiful brilliancy to the enamel.

Under no circumstances apply powdered pumice to the teeth. This mars the enamel to a degree that it is with the greatest difficulty that you can again bring back the brilliancy. All discolorations and stains upon the enamel are readily removed by using a powder composed of organic substances, such as powdered oyster shell, etc. The preparation that I am using contains no crystaline grit, but is sufficienty abrasive to remove the stains, and at the same time, when applied in a mixture of a heavy paste with the ordinary brush wheel, will leave a very smooth and clean surface.

More attention should be given to polishing between the teeth, as we know at this point decay occurs most frequently. This tape, which is of unwoven floss, is filled with a friction powder, and is thin enough to readily pass between the teeth. It is found very effective in polishing beneath the free gum margin and these places where it is impossible to reach with the tooth brush.

Patients invariably remark, "Doctor, that is the way I want to keep my teeth." I direct them to use only brush and water, after which give the teeth a dry rub with this preparation. They readily carry out these means of caring for their teeth, and it is very gratifying to yourself, as well as the patient, to note how beautiful as well as the perfect state of health in which the teeth are kept by those patients who carefully carry out this regime of treatment.

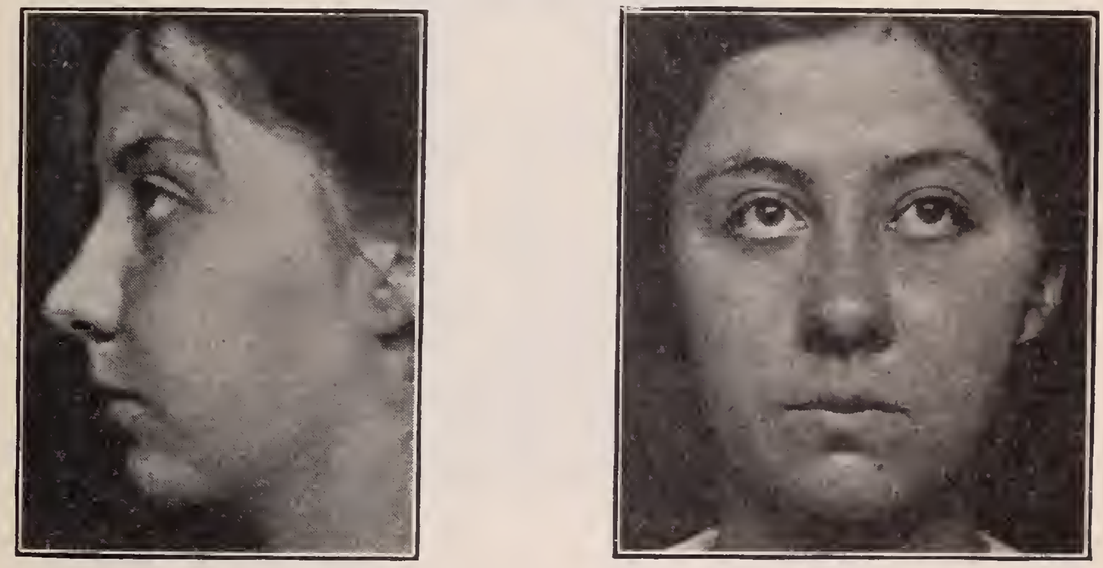
# OSTEO-SARCOMA OF THE ANTRUM OF HIGHMORE*

BY E. S. MAY, M. D., CINCINNATI, O.

CLINICIAN IN SURGERY AND ASSISTANT DEMONSTRATOR IN SURGERY: MEDICAL DEPARTMENT, UNIVERSITY OF CINCINNATI.

THE HISTORY OF THE CASE which I wish to present to you is, briefly, as follows:

Mrs. N., twenty-three years of age, had the usual diseases of childhood. Her family history and previous medical history is negative as to any bearing on her case. Syphilis, negative. About eight weeks before she came under our observation, in May, 1909, she discovered a mass on her cheek under her left eye, over the malar eminence and also below and to the inside of it. Some weeks prior to this time she had had trouble with an upper tooth on the left side, and her family physician was of the opinion that there was possibly an empyema of the antrum of Highmore, with a carious tooth as a starting point. She was then examined by Dr. K. L. Stoll, who found a solid tumor in the antrum. The right antrum, the one not involved, clearly permitted the passage of light in the transillumination test, while the left antrum presented an opaque mass which allowed no rays of light to pass through. This solid tumor, in its growth, had expanded the bony walls of the antrum. It grew forward, downward and inward, causing the swelling apparent on the cheek, and, pushing down the palate, encroached on the buccal cavity. It also pushed the nasal wall inward, obstructing the nares. There was no swelling, redness nor tenderness of the nasal or buccal mucous membrane, nor was there any history or evidence of a purulent nasal discharge. The mucous membrane appeared to be healthy. In its growth of about eight weeks the tumor had given no pain. An X-ray examination by Dr. Sidney Lange shows a *solid* tumor within the distended antrum, eliminating the possible diagnosis of a cyst in the antrum or a collection of pus. Gumma



Before operation, July 3, 1909.

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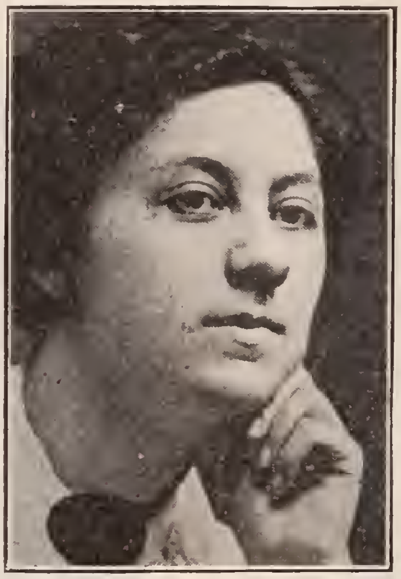
*Clinic Ohio State Dental Society.

was thought of as a possibility, but the absence of any other symptoms and the negative syphilitic history ruled out a tertiary lesion of syphilis. Fibroma was next thought of, since it is not an infrequent tumor in this locality. These tumors, however, are of slower growth. After a careful consideration of all of the findings, a diagnosis of sarcoma was made, and in the best interest of the patient immediate operation was advised. The patient's husband was duly informed that we could promise very little in the way of a cure, but accepted the operation, and the patient was operated next day at the German Deaconess' Hospital.

Under chloroform anesthesia an excision of the superior maxilla was made. The technical difficulties, both of operation and anesthesia, were lessened by making a preliminary tracheotomy and inserting a tracheotomy tube. The anesthetic was started in the usual manner, and as soon as consciousness was lost the tracheotomy was made, a tracheotomy tube inserted and the anesthesia safely and cleanly maintained by means of a funnel inhaler and the tube. The pharynx was tightly packed with gauze, which effectually prevented the entrance into the trachea from above of air or blood. This permitted us to work rapidly, the anesthesia being continuous. The necessity for frequent sponging of blood from the mouth and throat was obviated. The anesthetist was removed from the field of operation, permitting us to work more rapidly. After inserting the tracheotomy tube, sutures were provisionally placed in the skin wound, which were later tied, after the patient had fully regained consciousness, and the tracheotomy tube and temporary packing in the pharynx removed. Breathing was then resumed in the normal manner. The small amount of blood oozing from the wound and mucus from the throat was expectorated by the patient. The preliminary tracheotomy is a simple procedure, takes very little time and adds nothing to the shock of the operation. It shortens the time required for the operation and enables the operator to proceed deliberately in the removal of all diseased tissue. The danger of an inhalation pneumonia is eliminated, since there is no possi-



Three years 7 months after operation, July 1910.

bility of the patient taking into the lungs any blood or mucus with the inspired air. It is my opinion that the method is an ideal one, and should be more generally employed in major operations about the nose and mouth.

The tumor removed is about the size of an English walnut, and grew from the walls of the antrum, filling and dilating it. It was very hard in consistency at one pole, but softer and more friable at the other. It had grown forward, downward and inward. Microscopical examination of the tumor proved it to be an osteo-sarcoma. Osteo-sarcoma in this locality is of comparatively infrequent occurrence, the round cell and spindle-cell variety predominating.

The patient made an uninterrupted recovery from the operation and has gained weight. The deformity is slight, and to an extent is obviated by a proper fitting dental plate which was made for her by Dr. E. H. Troehler. This plate is easily removed, can be kept clean and is not worn continuously.

The result is very gratifying, and while I do not present the case as cured, it being only three years and seven months after operation, I do present it as one in which there is, at this date, no sign of recurrence."

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## SOME INFLUENTIAL FACTORS IN THE PROGRESS OF DENTISTRY*

BY HOMER C. BROWN, D. D. S., COLUMBUS, OHIO

THE HISTORY OF DENTISTRY as a profession commences in 1839. During this and the two succeeding years the four most important factors in the progress of dentistry as a profession had their beginning. They are the Dental Colleges, the Dental Societies, the Dental Journals and the Dental Examining Boards. One remarkable and interesting feature in this connection is the fact that two men, Drs. Horace H. Hayden and Chapin A. Harris, were directly responsible for the first named of these factors, and probably the influence of these had a direct bearing upon the other. I think it can be stated, without any reasonable excuse for contradiction, that these two men in a brief period of time did more for the advancement of dentistry than has ever been accomplished before or since in five times the length of time and regardless of the number actively interested. It is a difficult task for some to tread a path even when it has been blazed, and for that reason every possible honor is due all pioneers for originality and perseverance.

It is true that they only laid the foundation, but viewing their achievements, after some seventy years, it would seem that they were imbued with an insight into the future of dentistry and the needs for its proper development, that is beyond the comprehension of most of us. The active mind in this combination was Dr. Hayden, who had passed "the allotted three score and ten." Singular enough is the fact that through his energies at this advanced age, he has and will continue to attract favorable attention to his home city, Baltimore, long after Dr. Osler, another citizen of the same place of more recent date, has probably been forgotten. Had Dr. Osler investigated the service that Dr. Hayden rendered society in general and the dental profession in particular, he certainly should have made an exception of him, or, more preferably, never announced his theory.

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*Read before the Columbus Dental Society.

The first college was naturally limited in many ways and handicapped by a jealous resentment from the medical profession, but there always must be a "first," and it was fortunate that two such men were champions of this new institution of learning, as it requires strong characters to do pioneering, regardless of the field in which this is done. This institution and these men bravely met and conquered such adverse conditions as confronted them. The Ohio College of Dental Surgery was organized in 1845, at Cincinnati, and is the second oldest dental college. The Philadelphia College of Dental Surgery was the third, holding its first session in 1852, and later became the Pennsylvania College of Dental Surgery. These three colleges are recognized today as honored institutions in the dental educational world. Other colleges were chartered from time to time, until now we have some sixty in the United States, as well as similar institutions in most of the foreign countries. Formerly many of those from foreign countries desiring to study dentistry came to America, but I am inclined to think that this is not nearly as general as it was some few years ago.

Naturally the subjects taught in the early days of the dental colleges were decidedly limited and the requirements for graduation not so exacting as at present; however, there has been a general and gradual increase from time to time until now the preliminary educational requirements for entrance, as well as the college curriculum, have advanced until the graduate of a reputable college of today is decidedly better equipped for the practice of dentistry than were the graduates of the same institutions fifteen or twenty years ago. In addition to this, the ambitious beginner has the best of opportunities, through the dental journals and the dental societies, to continue his studies and achieve a position of honor for himself and be a credit to his profession. Some few years ago the National Association of Dental Faculties raised the attendance requirement from three to four years, but this was not well worked out in advance and they promptly went back to a three-year course, with an increase in the number of teaching weeks. The subject of "The Modern Dental College" was so recently presented, by Dr. Semans, that I shall not further discuss the present status of this important factor in our progress.

The American Society of Dental Surgeons was organized August 18, 1840, and is the first dental organization of record. However, there is a reference in dental histories of a dental organization in New York City in

1837 and another, some time later, known as the Dental Association of Western New York, but both these seem to have been only temporary, as no permanent record was left by either. Drs. Hayden and Harris were most active in the organization of this society, and the former was elected its first president and served until his death, which was in 1844. Dr. Solyman Brown, the first recording secretary of this association, said of Dr. Hayden: "When he shall have been forgotten as a dental practitioner and physiologist, he will be remembered by his professional successors as the father of the American Society of Dental Surgeons." In this connection I consider it appropriate to quote from an address made by Dr. Hayden at the meeting called to discuss the advisability of organizing this society, in which he pleaded the cause of the organization as a means of elevating the profession from its then neglected condition to the dignity of a science. He further said: "Renewed efforts are making in England, France and Scotland to place our profession on still higher ground than it has yet attained; and shall we of these United States of America remain inactive in this grand endeavor? For myself, I cannot brook defeat in this favorite undertaking. I prefer rather to make renewed and redoubled efforts to secure success. If, like the Jews, we are scattered and despised, may we not, like that persecuted people, at least hope for a day of restoration to our promised land! There are, indeed, many obstacles still to overcome. A new race of Canaanites must be expelled from our borders. Many errors must be exploded, and much ignorance must be dispelled, before the light of truth will beam clearly upon our path; but with diligence; zeal and perseverance, we are certain of ultimate success. Let us, therefore, go forward in the good cause unintimidated by the scepticism of the faithless, the fears of the timid, or the apathy of the selfish. If there are some who prefer to plod onward in the path of private enterprise, let us unite our efforts in one great social endeavor to elevate our profession from the degraded condition to which it has sunk and which it must ever remain until the high-minded and well-educated amongst its practitioners shall unitedly arise and shake themselves from the dust."

The Virginia Society of Surgeon-Dentists was organized at Richmond, Va., December, 1842, but only existed for a short time.

The Mississippi Valley Dental Association was organized at Cincinnati, Ohio, August 13, 1844, and was a most active dental organization for years. This society met in Cincinnati in 1889, while I was a student at the Ohio College of Dental Surgery, and it was my privilege to attend this meeting. I well remember that our late Dr. D. W. Clancy gave a clinic, using one of the students as a patient. This organization held its last meeting in Cincinnati April 15 and 16, 1896, at which time a tablet was unveiled, at the Ohio College of Dental Surgery, in honor of Dr. James Taylor, who did so much to advance the dental profession in the territory west of the Mississippi.

The oldest dental society in existence today is the Pennsylvania Association of Dental Surgeons, which was organized in 1845. The Northern

Ohio Dental Association was organized in 1857 and is the second oldest dental society in existence. Following this many state and some few sectional societies were organized, until today we have an organization in every state in the union except Wyoming, and a letter from there within the past week conveys the information that they hope to be organized at an early date and requested such assistance as I can give them.

The American Dental Convention was organized in Philadelphia August, 1855, with a membership of 80, which was increased until at the third meeting in 1857, at Boston, they had 190 members. There seemed to be a feeling, with some, that this organization did not meet the requirements of the dental profession. This dissatisfaction increased until 1859, when some of those in attendance at the annual meeting, held at Niagara Falls, got together and organized the American Dental Association and formulated a constitution and by-laws, which was adopted the following year in Washington, D. C. This association did not meet in 1861, but met in Cleveland in 1862, with a limited membership of fourteen. At a meeting in Chicago in 1865 there were 125 present, and at the meeting of 1870 there were representatives from forty-seven societies and three colleges, besides their regular members. This association continued, with varying success, until 1897, when the present National Dental Association was formed by a union of it and the Southern Dental Association.

The Southern Dental Association had been organized in 1869 and was quite active and influential in the Southern States. Provision was made in the constitution of the N. D. A. for a southern branch of that association, which meets annually, except every third year, when the National meets in the South.

For several years there has been a growing feeling in the profession that our National Dental Association should be reorganized along similar lines to the American Medical Association. This has been agitated both by members and non-members, and now that most of the state organizations have recently undergone decided changes, with a greatly increased membership, it would seem that the time is at hand when the dental organizations from all States should take favorable action and support the proposed plan, the constitution of which was tentatively adopted at Cleveland last July. Our local society is to be congratulated upon its action in recommending that our state organization become affiliated with the National and favorable action upon this by our State Society places us in the progressive list. Every state society which has met, except West Virginia, has taken official action to become a component of the National, and other reports indicate that a large majority of these organizations will take similar action. West Virginia will hold their 1912 meeting in August and deferred acting until then, as this will give them ample time, since the National does not meet until September 10 to 13, in Washington.

If a sufficient number of state societies support this plan of reorganization the National Dental Association will become a representative body, with a decided increase in membership, and publishing its own journal. The consummation of this will naturally be a distinct asset to our profession and have a potent influence in advancing its interests in numerous ways. We need not be accused of being selfish in this, since our clientele receive the greatest benefits from our advancement. For instance, think of the work which has been done in the past few years in our endeavor to educate the masses to the proper consideration and benefits of a hygienic mouth and that by persistent personal care much trouble will be avoided.

The organization side of our profession has not been developed in keeping with the colleges, journals and examining boards, and the fact that it has been possible for a limited number of persons to put their individuality into these and make a success of them is one plausible reason why the profession has not been more thoroughly organized. Numbers are quite essential in effecting influential organizations, whether professional or trade, as it is quite necessary to have as members a good proportion of those representing any particular class before it can be stated that an organization is a representative one. These dental organizations with a limited membership, composed of those interested in the advancement of the profession, have had a distinct influence in the building up of these other factors and it can be stated generally, and without any seeming room for disagreement, that the dental organizations have been the power behind the colleges, journals and the state examining boards and have been largely responsible for the success that has come to them.

The practice of dentistry is a limited field, with restricted environments, and it would seem that it has been quite easy for some to fall into habits which are necessarily antagonistic to any form of advancement. In order to combat this, those who have been interested and active in making the most of our opportunities have found it expedient to do considerable educational work within the profession. This has compelled all dental organizations to be extremely lenient in the courtesies extended to non-members, many of whom have assumed an unappreciative attitude by taking advantage of everything that was prepared for them without showing a sufficient interest to become affiliated with such organizations and share responsibilities and honors. However, persistent and combined effort, backed by reason and merit, will in time generally succeed, and in the last few years this educational campaign has shown favorable results. Many of our busiest practitioners have made great sacrifices in their efforts to awaken an interest in those who seem surrounded by a barrier wall of self-conceit and possessed with an over-abundance of indifference.

One of the distinct advantages of the dental organizations, and this particularly applies to the local societies, is that it brings those practicing under similar conditions into closer relation with each other and tends to make us co-workers instead of competitors, and no doubt we have all heard the later term used. It is unreasonable to expect the individual to eliminate all selfish characteristics, since this is not in harmony with one of the first laws of Nature, but it is not unreasonable to expect, as confreres in an honored profession and fellow members of an organization laboring to advance its interests, that we should be charitable with our fellow practitioners. I have much sympathy for a man who fails to recognize that the best of us make mistakes, and he who thinks the only road to success lies in finding fault and unnecessarily criticising what others have said or done, is most assuredly cultivating a habit which will sooner or later prove embarrassing, to say the least. I have made it a practice to commend any particular good piece of work coming under my observation, but make no comment which could not be made in the presence of the operator regarding what might seem to be a poor operation. My advice to such members of the senior class as may be present, and this is not necessarily restricted to these, is that we all strive to make each operation better than the previous one and practice the Golden Rule. Also, subscribe for such dental journals as you can afford and have time to read, and become affiliated with your dental organizations and be ever ready to give your best service to any work which may be assigned you.

The dental journals have been most influential as a factor in our progress. They have been to the profession what the public press is to the laity—a power in moulding the opinions of their readers; and, therefore, their opportunity for good is in proportion to the number of subscribers since the journals, as a usual procedure, are diligently working to promote the best interests of the profession. Few articles are now written directly for the journals, but are usually presented before some organization and published in the journal acting as its official organ. Those of particular value are frequently copied in other journals, which increases their usefulness to the profession. The first dental journal was published in 1839 and known as *The American Journal of Dental Science.* This, like the first college and the first society, was largely promoted by the same Hayden and Harris. *The Dental Register of the West,* and *The Dental News Letter* both started in October, 1847, and the last to be started, at least so far as I know, is *The New Jersey Dental Journal,* the first volume of which was published in January, 1912. We now have fifteen or more journals published in the United States, and in all probability the National Dental Association will soon publish a National Dental Journal, provided that the reorganization proposition is liberally supported by the state societies.

Alabama passed the first dental law in December, 1841, New York the second, April 7, 1868, and Ohio the third, May 8, 1868. There is some contention that Kentucky passed the second in 1867, but credit is generally given in the above named order. From time to time the various states have passed laws until now I believe that there is no state in the union without a dental examining board.

These boards have rendered excellent service in advancing the interest of the profession and at the same time safeguarding the interests of the public, by greatly reducing the dangers incident to falling into the hands of those not qualified. I say "greatly reducing," not eliminating, as it is a very difficult problem to drive out all violators of our dental laws, and I regret to state that if this was accomplished it would not entirely remove the incompetent ones. These examining boards have done much in stimulating the colleges in raising the requirements, which has encouraged them in better equipping their graduates; besides, they have prevented many, who have been able to graduate in some way, from beginning practice without first possessing the qualifications required by them. They were the direct cause in eradicating the fake dental colleges and have rendered most efficient service in many ways. It is quite unfortunate that frequently political influence has received too much consideration in the appointment of board members, rather than professional qualifications. The profession, through its organizations, should be active in seeing that good men are appointed and then recognize that their responsibility does not cease there, but give the board their loyal support in carrying out the provisions of their law.

In addition to the influential factors herewith considered, we should not fail to mention that Horace Wells and William T. G. Morten, as dentists, rendered humanitarian service to the world at large and attracted favorable attention to our profession in the early forties by their discovery and demonstrations of nitrous oxide and ether as anesthetizing agents. Official recognition has been accorded these men at home and abroad, and every member of the dental profession should feel an inspiration in reviewing the achievements of these and our other pioneers.

Ohio has always been in the forefront in all this progress. She had the second college; shared honors with Pennsylvania in the second oldest dental journal; had the third state dental law; has the second oldest dental organization in existence today; and has furnished to the profession many notable characters who have been called to their reward, such as: James Taylor, George Watt, Jonathan Taft, William H. Atkinson, John Allen, F. H. Rehwinkle, W. D. Miller, and others. In addition to these we can mention, with propriety and a keen sense of loss to our local profession, the names of Otto Arnold, J. B. Beauman and W. H. Todd, whose marked abilities, strong personalities and high regard for our professional status makes their memory one of reverence for the departed.

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We have received copies of the Nebraska Dental Journal, published by the Nebraska State Dental Society, under the editorial management of S. A. Allen, D. D. S., Lamp City, Neb., and are pleased to add it to our exchange list. Editorially and mechanically, the Journal is one of the most attractive that comes to us, and should certainly prove of great value to the members of the Society which it represents.

# ACUTE OSTEOMYELITIS OF THE JAW.*

BY W. WAYNE BABCOCK, M.D.

SURGEON TO THE SAMARITAN AND GARRETSON HOSPITALS, PHILADELPHIA.

OSTEOMYELITIS IS AN INFLAMMATION of the marrow and adjacent osseous tissue of a bone. Usually the inflammatory process is wide-spread, tending to involve the entire marrow cavity, the process, as a rule, being very destructive with extensive secondary necrosis of the bone. Of the jaws, the upper jaw, on account of its protected position, the peculiarities of its vascular supply and the absence of any true marrow cavity is so free from this disease, that osteomyelitis of the lower jaw only will be considered. While the lower jaw has no distinct marrow cavity as compared with one of the long bones, it has a central nutrient canal containing the inferior dental nerves and vessels, adjacent cancellous tissue, which largely disappears near the symphysis, all enclosed by firm, dense walls of compact bone surmounted by soft cancellous bone forming the alveolar portion. An inflammatory process within the body of the lower jaw, while it does not spread through a mass of soft marrow quickly produces serious involvement of the inferior dental vessels and nerves. There follow, therefore, a rapid death of the interior of the jaw involving half or even the entire body of the bone and an interference with the circulation and enervation of the teeth followed by their progressive loosening, and frequently complete separation from the softened or disintegrated alveolus. Osteomyelitis of the jaw is, therefore, to be differentiated from the simpler infections and forms of necrosis by:

(*a*) The extensive involvement of the contents of the inferior dental canal.

(*b*) The tendency for the widespread secondary destruction of bone.

(*c*) The damage to many or all of the lower teeth.

Alveolar abscess, periostitis and many forms of necrosis produce a relatively limited involvement of the mandible.

From a clinical standpoint, osteomyelitis also differs from other infections of the jaw by the fact that it develops within the bone, and therefore local swelling is not a primary feature; from the fact that many teeth are involved and that their involvement is secondary; by a tendency to widespread bone necrosis, and especially by the very early and often violent general systemic disturbance from the absorption of septic material retained under tension within the body of the jaw.

## ETIOLOGY

The jaw is exposed to infection by reason of its exposed position, its many duties, the proximity of the cavity of the mouth, and by reason of the contained teeth. Apart from traumatic injury, it would seem probable that bacteria would reach the interior of the bone chiefly from the mouth, especially through infected dental canals. The possibility that bacteria may be carried by the circulation and be deposited from within, as so frequently occurs in the long bones of the body, is also to be considered, especially in the forms of osteomyelitis developing without evident cause in young persons. The well-recognized types of osteomyelitis, of traumatic origin, those following infectious diseases such as typhoid and typhus fevers, or the exanthematous fevers as smallpox, scarlet fever and measles, or such severe constitutional disorders as scurvy are well recognized and will be given little consideration. Poisons leading to inflammation or necrosis of the jaws such as phosphorus, the dust from mother of pearl, as well as the more chronic inflammatory and degenerative lesions occurring in association with locomotor ataxia, syphilis, tuberculosis and actinomycosis, I shall not discuss at this time.

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* Read in the Section on Stomatology (A.M.A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession, by special arrangement with the *Jour. Amer. Med. Assn.*

The form to which I particularly desire to direct attention is the developmental type which occurs between the twelfth and sixteenth years. It is not a common condition and probably is seen more frequently by the physician than by the dentist. Usually a correct diagnosis is not made until widespread destruction of the mandible has occurred. For this reason the condition deserves especial attention. It may be compared to the osteomyelitis occurring in children and involving the long bones of the extremities. In the latter infections, the exciting cause is often trivial; the child may have been exposed to cold and wet, perhaps has waded in cold water, or has fallen and received a slight bruise on the shin or other part and there rapidly follow signs of a severe infection, chill, fever, delirium and widespread destruction of bone. The infectious organism, usually the staphylococcus or streptococcus, has been circulating in the blood and has localized in the bone as a result of the slightly lowered local resistance. So it is with the mandible; the teeth may be crowded or may have erupted irregularly; possibly a corrective appliance has been fastened to the teeth and as a result, the oral cavity contains a larger number of bacteria than usual; or an extraction may have been done, a large cavity may be present or the child may have received a slight blow over the jaw. Again, there is no history of any of these conditions, and the disease develops without apparent cause and it is probable that infection originated as in the forms of osteomyelitis of the long bones, from the lodgment of bacteria carried in the circulating blood.

## PATHOLOGY

The pathology of acute osteomyelitis of the lower jaw is that of a rapidly spreading infection along the inferior dental canal. Whether the bacteria invade the area from the blood-stream, through the root canal, the cavity left after the extraction of a tooth, or the opening from a fracture of the jaw, the danger lies in the involvement of the inferior dental vessels. The inflammatory exudate of serum and leucocytes soon fills the canal and compresses the nutrient blood-vessels; and from the pressure and infection, thrombi form in the vessels, the circulation is arrested and rapid degenerative and inflammatory changes occur in the bone. The alveolar process softens, the teeth loosen, and if the exudate within the canal becomes purulent it burrows along the roots of the teeth, finally escaping at the gum margin, or perforates the process, the pus collecting under the mucous membrane or skin, finally to discharge or evacuate. As the pus or exudate passes through the bone, it lifts the overlying periosteum, and as this is stripped from the bone, the osseous circulation is cut off from without as well as from within; thus it follows that a rapid and very widespread necrosis is usual. The inflammatory edema may spread to the floor of the mouth, to the epiglottis and larynx, thus seriously interfering with deglutition and respiration. Bacteria may enter the facial veins and be carried into the sinus of the skull, producing septic sinusitis or meningitis. The buccal layer of the process usually suffers more than the lingual.

## SYMPTOMS

As with other forms of osteomyelitis, the early local symptoms are often relatively slight so that serious damage occurs before the condition is recognized. A child may complain of only slight discomfort in the jaw or of toothache, and in the early stages, as the process is confined within the bone, there is little edema or external swelling to indicate the deep lying mischief. Prolonged firm pressure over the body of the bone or on the teeth may, however, elicit diffuse tenderness. Especially striking are the severe constitutional symptoms. Often there is an initial rigor or chill followed by a rapid pulse, high fever and at times delirium, entirely out of proportion to the local signs. This early disproportion of the local and constitutional symptoms is of great diagnostic import. Within from twenty-four to forty-eight hours the beginning loosening of the teeth and the increasing edema of the adjacent tissues indicate that the condition is much more serious than an ordinary toothache or alveolar abscess, while the increasing temperature and pulse-rate, and possibly delirium, show the serious septic absorption. As the bony process is perforated, the external swelling becomes evident, abscesses form or on pressure pus escapes from under the gum margins. The face assumes a puffy, pasty appearance, with the rapid development of a severe septic anemia. Complications to be feared are extensive or total necrosis of the mandible, severe sepsis which may be fatal, edema of the epiglottis or larynx causing suffocation, pyemia or secondary infection within the cranium. The teeth may be lost or seriously damaged.

## DIAGNOSIS

The diagnosis may be made by the history, the severity of the early general symptoms, with relatively slight local symptoms, the pain on prolonged deep pressure over the body of the jaw, or on the teeth, the early widespread loosening of the teeth, and the general septic manifestations.

With the secondary swelling of the adjacent soft tissues and the discharge of pus, the diagnosis is confirmed.

### TREATMENT

The treatment should aim to prevent widespread necrosis and other complications. Most important is the early securing of a vent for the escape of inflammatory exudates from the bony canal. At the outset a small opening through the bone, by relieving tension, may entirely arrest the process, preventing the formation of pus, the interruption of the circulation and the widespread destruction of bone. The cleanest opening may be made from without through a minute incision carried along the under surface of the jaw to avoid conspicuous scarring. The incision is carried to the bone, which is drilled until a free vent is secured on the affected side for the inferior dental canal. In some cases, seen very early, external drainage may not be required, and the skin incision may be immediately closed with a reasonable hope that the inflammatory exudate will pass through the opening in the bone and will be neutralized and absorbed in the subcutaneous tissues. The bone may also be drilled from within the mouth, remembering that the inferior dental canal lies about or just below the level of the mucous reflection from the mandible to the cheek. Unfortunately, this desirable prophylactic treatment may rarely be instituted. The parent or untrained attendant delays and the patient is first seen after suppuration has started. The teeth are loosened and there is some discharge of pus into the mouth. At this time it is important to try and preserve the teeth, to give a free vent to the discharges and to limit septic absorption on the part of the patient. If the process be a relatively limited one, drainage through openings made within the mouth may be sufficient.

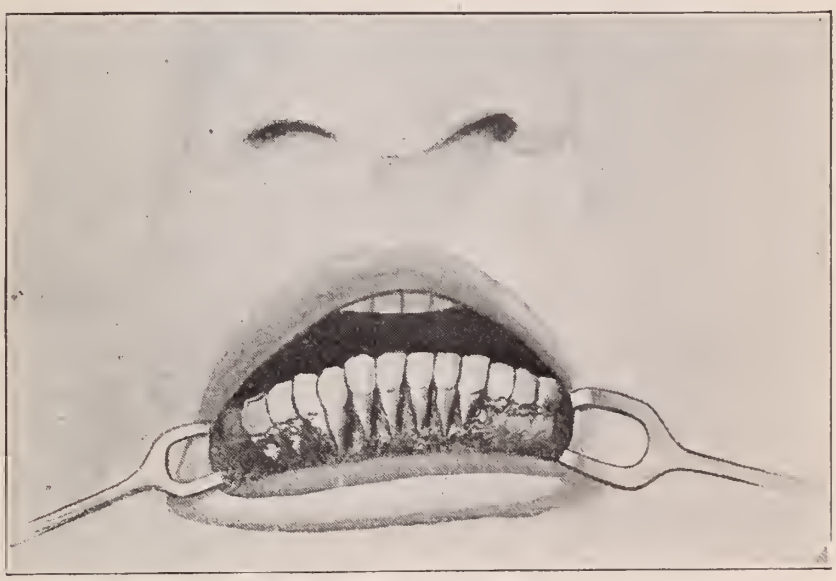

Fig. 1

Fig. 1.—Developmental type of osteomyelitis occurring during the regulation of the upper teeth at the age of 13. The anterior part of the alveolar process has been entirely destroyed and the incisors hang by a delicate attachment to the lingual mucosa only. These teeth gradually became reimbedded in new-formed process. The separation of gum margins and escape of pus along the bicuspids is shown. All the teeth were involved but were retained.

Under nitrous oxid anesthesia the gum and external plate of the alveolar process are to be freely separated from the buccal surfaces of the teeth by means of a small but strong knife for a distance as far as there is evidence of distinct bony destruction. In this way, a fairly free vent from the interior of the bone may be secured into the mouth. Frequently a number of the teeth will spontaneously separate from the alveolar process and will be found to hang merely by a bit of mucous membrane. As a rule, these teeth should not be detached or removed. If it is evident that the discharge of pus will be free and long continued or that a sequestrum of considerable size will be formed, it is best at once to make free external incisions from under the body of the jaw. In this way the bulk of the pus is permitted to escape promptly from the body instead of passing into the mouth, perhaps to be swallowed, or to contaminate the cavity. Drainage is to be facilitated as necessary by drilling or opening the bone and by introducing through the external incision strips of gauze which must not be tightly packed. Over all external wounds, a heavy moist dressing is to be constantly applied. I prefer gauze wet with 30 per cent alcohol saturated with boracic acid, to which is added 5 per cent of tincture of myrrh or compound tincture of lavender, all being covered by rubber tissue or oiled silk, and a thick layer of cotton. Drainage is also facilitated by keeping the patient propped up in bed, and hot-water bottles are applied over the dressing. If the external drainage is insufficient, and particularly if large sequestra form, the incisions must be sufficiently enlarged from time to time as is found necessary so that the patient does not become too cachectic from constant pus absorption. Mouth washes such as 0.5 per cent permanganate of potash, liquor antisepticus alkalinus, or diluted alkalinized peroxid should frequently be employed. The internal administration of the time-honored tincture of the chlorid of iron in doses of from 10 to 15 minims every two or three hours is also of value from its local as well as its systemic action.

Extensive edema of the floor of the mouth calls for free external incisions. Serious edema of the larynx or epiglottis may be treated by steam inhalation, epinephrin sprays and, if suffocation threatens, by scarification, intubation or tracheotomy.

The fate of the involved teeth is most interesting. During the destructive process within the bony canal, the nerves and vessels entering the apical foramina of the teeth are severed or destroyed. Later, however, as granulation tissue forms, the root, which may have been entirely free and exposed, becomes imbedded in the new granulation tissue and an opportunity is afforded for the proliferation of new blood-vessels in the pulp chambers of the loosened teeth. Granulation tissue also becomes attached to the surfaces of the teeth, and as the imbedding process proceeds the root, which at first may have dangled from but a bit of adherent gum on its buccal surface, becomes covered in large part by granulation tissue and proliferating mucous membrane. Gradually the root is imbedded and the tooth becomes more firmly attached and with the regrowth of the alveolar process, acquires a solidity sufficient for even violent forms of mastication.

It is surprising that evidence of putrefaction of the pulp is not universal, but I think that this is explained by the early free drainage and later by the possible growth of resorbing granulation tissue through the apical foramen. One recalls that celebrated experimenter of a century ago, John Hunter, who implanted a tooth in the comb of a cock and showed that a vascular penetration into the center of the tooth took place so that on injecting the comb, vessels within the tooth were likewise injected. Recent experiments with closely opposed cover-glasses placed within the abdominal cavity have demonstrated that granulation tissue has a remarkable power of invading narrow spaces. While our present knowledge is against the possibility of heterologous transplantations such as the transplantation of a human tooth into the tissues of the fowl, we need not doubt Hunter's observation that the cavity of the tooth became vascularized even though a true transplantation was not effected.

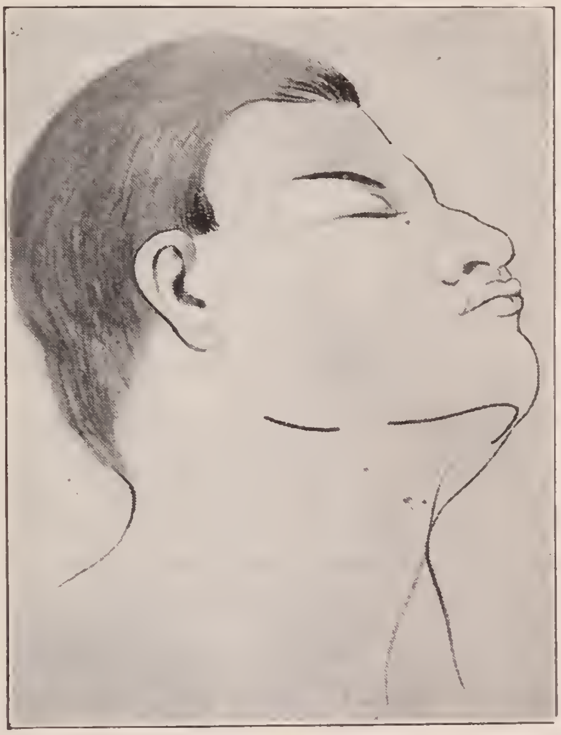

Fig. 2

Fig. 2.—Lines of incision interrupted over the facial vessels for drainage in osteomyelitis. The surfaces of the bone and the floor of the mouth may be drained through these incisions. Should the resultant cicatrix be unsightly, it may later be excised and a careful plastic approximation done to render the scar inconspicuous.

In the developmental type of osteomyelitis conditions are different. The tooth is not an alien substance and is never, as with a transplanted tooth, completely separated from its source of nutrient supply. With the reformation of the alveolar pprocess and the imbedding of the loosened tooth, its vitality should approximate that of a tooth in which the root canal has been filled, rather than that of a replanted tooth. One should also consider the possibility of the reestablishment of an internal vascular supply to the tooth through the apical foramen. The absence of distinct discoloration and the preservation of translucency of some of these teeth have suggested to me the possibility in a revascularization or reformation of a vascular pulp, after the contents of the apical foramen have been completely divided. It would seem as if this were not beyond the bounds of possibility.

That some of these teeth will be treated by the tissues as foreign substances and have progressive absorption of their roots, while others will retain sufficient nutrient supply to retain. at least in part, a nutrient connection with the adjacent tissues would seem plausible. In the first instance, the teeth may be retained and be of service from a few months up to ten or twelve years. In the latter case, the retention of the tooth should approximate that of a tooth with a devitalized nerve or be from ten to twenty years. In any case, the probability of a considerable period of useful functionating is sufficient argument for the retention of all attached teeth, even though they retain but a slight mucous attachment after the destructive effects of the osteomyelitis. During the formation of the granulation tissue which progressively surrounds the separated roots, the mouth should, of course, be kept as clean as possible. Excessive granulation tissue in exposed portions of the bone or root should be touched with 5 per cent solution of nitrate of silver. As the teeth become imbedded, and as the mouth becomes cleaner, appliances very cautiously inserted may be desirable to regulate and to hold the teeth in proper position. If these are used, the serious deformities so often seen as a result of unnecessary extraction of teeth or too radical early removal of bone may be avoided. For extensive bony necrosis I would warn against the early removal of the sequestrum; if sufficient external drainage is maintained, a delay of months sufficient to enable the formation of new bone may be obtained so that when the sequestrum is finally removed a loss of the chin or the destruction of the contour of the body of the jaw may be prevented.

For the types of osteomyelitis occurring in middle and advanced life, such conservatism, especially as concerns the teeth, is, of course, less important. The danger of osteomyelitis and its grave prognosis in patients with serious systemic disease, particularly diabetes, should be mentioned. I have seen the removal of a loosened bit of bridgework in a middle-aged diabetic followed by rapidly spreading osteomyelitis of the lower jaw and death from diabetic coma. Dentists should more fully realize the importance of the urinary examination and the danger of operative work within the mouth in the presence of diabetes mellitus.

## SUMMARY

Osteomyelitis in the young occurs in the lower jaw as well as in the long bones of the extremities, although at a somewhat later age.

Its early diagnosis is to be based on the early severe, systemic disturbance, and the widespread involvement of the bone.

The prophylactic treatment consists in drilling the bone under aseptic precautions.

After the formation of pus, free drainage should be employed, which should be external if there be much necrosis.

No teeth should be extracted nor should teeth which merely hang from attached mucous membrane be removed.

Dead portions of bone should not be removed until entirely detached or until new bone capable of maintaining the contour of the jaw is formed.

Separated and loosened teeth with gum attachment usually become reimbedded and serviceable.

2033 Walnut Street.

### ABSTRACT OF DISCUSSION

**Dr. M. I. Schamberg**, New York: If there is any distinction in the pathology of osteomyelitis and other suppurative conditions of the mandible there should be a distinction in their clinical significance and certainly in the surgical management of these cases. I have during the past fifteen years handled a large number of cases of suppuration about the jaws, some of which I style suppurative osteomyelitis that call for extensive surgical interference, and I have likewise handled many cases in which a simple puncture through the gum tissues and alveolus to give evacuation to the pus was all that was necessary, and I do not believe the patient was subject to any great danger as outlined by Dr. Babcock. I never make external openings in operations of this character unless I feel that I cannot reach the entire area efficiently through the mouth, and I do not believe that there is any great danger in entering these regions too soon. We sometimes are enabled to render an operation more simple by waiting until Nature has localized the sequestrum and made it possible for the surgeon to remove it with great ease. One of the reasons why young children are so susceptible is that the temporary teeth are in the transitional stage, where they are about to be thrown off, and where any slight blow is likely to interfere either with the root of this tooth or with the erupting permanent tooth germ, and the reason why the infections are so severe is that these tooth germs are so located that infection spreads rapidly through the mandible.

**Dr. C. E. Frazier**, Kansas City, Mo.: In osteomyelitis of the jaw or in long bones, the same method applies to one as to the other, and I am sure that much of the trouble that has been pointed out in treating osteomyelitis is in the method of treating it. Usually the curet is run in and the necrosed bone scraped out and overhanging portions of bone left around the opening. The bones are supplied with blood and nutrition through the Haversian canals, and when the curet goes into a necrosed area and cuts it out, leaving a round hole in the bone, the blood-supply and the supply of nutrient material to the overhanging portions is destroyed, and the result is that after all the necrosed bone is thoroughly removed, then these overhanging portions break down and die. Then we have a larger area of osteomyelitis, which continues to increase. To overcome that, the first incision should be made large enough and should be cut out squarely or obliquely in order that there may be no overhanging particles of bone. Another practical point is the preservation, as far as possible, of as much as possible of the periosteum. If the periosteum is raised (leaving no overhanging places), and then laid down in proper position, it will facilitate the work and aid Nature in the redepositing of bone.

**Dr. Vida A. Latham**, Chicago: A case occurred in my practice, in which we had no history of an injury of any form; if I had had that one point, I could have saved the child. Nobody seemed to know of an injury. The only point in this connection that we could get was that the child had been sitting in the grass, and they thought it must be rheumatism. We must not forget that many cases of osteomyelitis are confused with rheumatic conditions. That child was suddenly taken ill on Saturday, and on Sunday morning I was called and found the child suffering with high temperature and intense pain in the lower extremities and in the back of the neck. Examination under anesthesia was refused. On Monday moring a consultation was held with a number of leading physicians, but no agreement was reached. By Tuesday the condition was such that I was sure it was sepsis. The child had a temperature of 104, and petechiæ on the wrists but would not allow any handling of the right leg, in which we noticed a flexing. One consultant said that if we noticed an eruption on the forehead we could be sure of smallpox. The following morning there was a rash, and they said it was smallpox. Consent to operation was not obtained until 5 o'clock Saturday afternoon, and we operated on the femur and got a beautiful osteomyelitic condition and septicemia. Of course, the child died Sunday morning, a week after the beginning of the condition. We found out afterward that the child had had a fall, hurting the knee.

Examination of the blood will help a little in these cases. We find in these conditions a most beautiful phagocytosis.

Dr. G. V. I. Brown, Milwaukee, Wis.: I wish to ask Dr. Babcock to explain how he accounts for and distinguishes conditions involving the superior maxillæ and mandible in which the symptoms as described present the characteristic swelling, the high temperature and the various other phenomena which accompany the infection, as when under ordinary circumstances one would reasonably expect to find pus after having openings, but in which there is no pus.

Only the other day I was called to see a patient in whose case openings such as have been described had been made and packing inserted. The only thing I could suggest was the removal of the packing by which an effort was being made to effect drainage. The woman was dying and there was no use in making her life unnecessarily miserable. They were giving streptococcus serum, and apparently all the well-recognized methods of treatment, but she had not the slightest evidence of pus on the wound surfaces. Such cases are more frequent than we realize. The other day, in a hospital with which I am connected, a child, 5 years of age, died of osteomyelitis affecting the lower jaw. The case would have been referred to me if the trouble had been recognized while the child was alive. Bacterial cultures were made in the hope of finding pneumococci, but without success until the vital force had become exhausted. As suggested by Dr. Schamberg, the question is really one of diagnosis.

Dr. M. L. Rhein, New York: Dr. Babcock, as a general surgeon, has fallen into an error of diagnosis. I question whether, where he makes a diagnosis, he realizes the difference in the tissues between osteomyelitis in one of the long bones, and osteomyelitis of the mandible, which he had under discussion. The general surgeon frequently diagnoses a condition of osteomyelitis where osteomyelitis does not exist, and in a certain respect I think this is due to his lack of familiarity with the detailed pathology of the mandible proper. When we study the substance of the mandible, the spongy absorbing nature of the alveolar process, and how it ends in the true bone itself, we find that it has a density of structure far greater than that of any of the long bones. I am not satisfied with the etiology which he gives in regard to these so-called cases of osteomyelitis.

The pulps of the teeth play a much more important rôle than he has conceded in reference thereto, and we cannot safely leave the pulpal conditions to themselves. At the present time, with the use of the radiograph, it is possible for us to localize very accurately the amount of tissue that is involved. If the diseased area involves to any extent the ends of the roots of the teeth, nothing should be permissible short of the thorough removal of the contents of the root canals of such teeth.

Premature operative interference, so far as any osseous necrotic area is concerned, is absolutely wrong, because it is impossible operatively to fix the line of demarcation. I am in accord with Dr. Babcock's opinion that premature operations of this kind interfere with the regenerative process, and that Nature will not respond in such a way as she does when we wait until sequestration has taken place. My own opinion is that osteomyelitis in the mandible is not of very common occurrence, as the hospital records would lead us to believe. In other words, I am convinced that many cases of what is nothing more or less than alveolar abscess are continually diagnosed in the hospitals as osteomyelitis, and treated, or rather mistreated, as such. I believe that every surgeon is liable to fall into such an error. The great number of doubtful osteomyelitis cases recorded illustrates the necessity of instilling more stomatology into the knowledge of general surgery.

Dr. W. M. Harsha, Chicago: The one point in Dr. Babcock's paper that I should like to emphasize is in reference to the diagnosis, which I think perhaps is most important. In the first place, we have the usual febrile action, and a good deal of pain. Pain is a very prominent symptom, and at first reaches all over the face. I have seen a few patients of that sort in whom the pain is all over the jaw, analogous to what we have in acute abdominal conditions, such as appendicitis, in which the appendix is acutely inflamed and the pain is distributed all over the abdomen. Morphin is not to be given indiscriminately, but I find that a full dose of morphin abolishes the reflex pain and limits the pain to the point more or less approximating the seat of the disease.

Another point that I wish to emphasize is that by pressure with the finger we can locate very exactly sometimes the location of the trouble, especially after the dose of morphin. This is true in the long bones, and in the mandible, not crudely, but going at it systematically, and we can often very definitely localize a small area, which gives us a clue to the location of the trouble. I believe that the same treatment prevails in this class of cases as in all cases of osteomyelitis, granted, of course, that we can approximate the location; I am thoroughly in accord with Dr. Babcock in advocating thorough incision; I would not hesitate to make an external incision to try to reach the point of infection. I know that the mouth is considered to be more or less immune from infection; that there is undoubtedly a degree of immunity there that some other locations have not, but I would not hesitate to open from the outside in any case in which I deemed it necessary. I believe that the most important point in osteomyelitis is to make an early diagnosis, and then early operation.

Dr. Thomas L. Gilmer, Chicago: I have seen many cases of inflammation of the jaws, but rarely, if ever, a genuine case of osteomyelitis of the mandible. Most cases known as osteomyelitis of the jaw are simple infections, originating in alveolar abscess. Suppurative osteitis (which strikes me as being a better term for this condition than osteomyelitis, since there is practically no bone-marrow, strictly speaking, in the lower jaw) may result from such abscesses. Most of the so-called cases of osteomyelitis which I have observed have originated in the alveolar process as the result of pulp infection. There are many other avenues of infection in the mouth besides the pulps of teeth. There are pus pockets about the roots of teeth due to so-called pyorrhea alveolaris; there are pockets between the gums and peridental membrane and the roots of teeth, due to improper contours. In these pockets food and bacteria collect. The fusiform bacillus and spirillum are found deep down in these pockets. This is an anærobic organism. Some of these infections of the bone are due to this organism, and when due to it we have a much more serious infection than when the condition is due to the staphylococcus. We have recently had in Chicago an epidemic of streptococcus infection of the pharynx, tonsils and jaws. Fusiform bacillus infections involving the jaws cause much swelling of a brawny nature, the infection and swelling passing quickly from one side of the jaw to the other, producing so-called Ludwig's angina, with edema of the glottis in the more serious cases, as indicated by Dr. Babcock. In some of these cases in which pus was suspected incisions were made, but no pus was found. It is believed by some that incisions should not be made unless the pus is palpable. Early incision for the purpose of relieving congestion I believe is indicated, but generally the incision should be external to prevent a mixed infection from mouth contamination. In a simple alveolar abscess, before the pus has burrowed through the process, it is good practice to drill through to the apical end of the root as indicated by Dr. Babcock, but if a fusiform bacillus, streptococcus or pneumococcus infection of the jaw is present, the drilling may do harm. I do not believe it wise under such circumstances to make incisions of any kind in the mouth, as it seems to intensify the inflammation, probably due to the introduction of other organisms from the oral cavity. If we know that the infection is due to a dead pulp and that the pus is very limited in quantity we might evacuate it through the tooth, but often this is impracticable owing to the small caliber of the root-canals.

I believe that making an opening on the outside of the face is the only way we can get good drainage in the posterior portion of the mouth when there is great swelling. Good drainage is of prime importance. In these serious cases mouth incisions invite mixed infections, which may add to the gravity of the case. I agree with Dr. Schamberg that where an abscess can be reached from within the mouth and thorough drainage maintained, it is indicated, but there are many cases in which this cannot be done.

Dr. M. J. Schamberg, New York: There is scarcely a week in which I do not open externally several times for the drainage of neglected abscesses and in a few cases of osteomyelitis. Danger, however, may arise from Dr. Babcock's advocacy of the external incision for the purpose of puncture in the early stages of a condition which may or may not exist and in which there is so great a difficulty in making a diagnosis. I would not agree with any paper that suggested an external incision where there was even no likelihood of finding pus; definite means of diagnosis should be arrived at before such a method is generally advocated.

Dr. W. W. Babcock, Philadelphia: The question has been very properly brought out by Dr. Schamberg as to the definition of osteomyelitis. If what I am talking about, and what you are talking about are different conditions, our conclusions cannot harmonize. Of course, in osteomyelitis we can include any inflammation involving the marrow cavity and adjacent bone. I direct attention today, not to a limited osteomyelitis but the form involving in many cases the nutrition of the entire lower jaw. I would consider only these cases in which the result is an involvement of all the nutrient vessels of the inferior dental canal. When this occurs, the first question is not whether we are to save the teeth or avoid scars, but rather whether we are to save the patient's life. As to prophylactic drainage, I do not think it makes a great difference whether we go from the inside or outside of the mouth, because an opening about the size of a gimlet-hole does not make much of a scar externally nor is there much danger of infection if we open from the outside. Later, however, free drainage may be extremely important, and it is advisable to open from the outside, because the tissues can be kept more aseptic, the drainage freer and the patient does not swallow the discharges. It is not a matter of a week or month in these cases, but usually a matter of a year or two years—and the tissues may discharge not pints but gallons of pus. In such patients it is paramount that this toxic material freely escape from the body. A curet may serve to spread and carry the infection.

The symptoms are not so clear as we would like to have them. First, there is little swelling or severe toothache. The swelling and loosening of the teeth, discharge of pus and necrosis are secondary symptoms.

The features are the early chill and fever. The early local symptoms are relatively inconspicuous; the pain may not at first be referred to the jaw. The degree of tenderness is also peculiar. Early transient pressure may not cause pain, and it is only when we make firm pressure continuously over the body that the patient finally cries out. It is not like an alveolar abscess or exposed dentine which is sensitive on the slightest touch. In the early stages the sensitiveness is not on the outside of the bone because the inflammation has not reached the periosteum. Early edema indicates different conditions. If from a streptococcus or pneumococcus infection, suppuration may not occur, As to the pulp in the involved teeth, does it remain or putrefy or what happens to it? That all pulp cavities should be evacuated and cleaned out is impracticable, as the teeth are so loose that they may often be picked out with the finger. The apical foramen is often exposed in the mouth and the drainage from the pulp cavity does no harm. The strange point is, if the pulp dies, why do the teeth at times retain their color and translucency? Later the pulp may regain some sensitiveness. How that could occur in a dead tooth is hard to understand. Hunter's experiments showed that a tooth imbedded in the comb of the cock had new vessels projected into the pulp cavity. We must remember that the condition in osteomyelitis is different from the imbedding of a dead tooth that may last only ten years and be absorbed and thrown off. The teeth are never completely detached or absolutely separated from their source of nutrient supplies. They may become, I believe, under certain conditions, revitalized.

## PRESIDENT'S ADDRESS*

BY H. P. MAGRUDER, D. D. S., NEW ORLEANS, LA.

IT IS A SOURCE OF GREAT PLEASURE to be in your midst, to see the enthusiasm displayed by our members, and the most cordial reception of our hosts, the good citizens of Alexandria.

For a great number of years the annual meetings of this society were held in New Orleans. This helped to a marked degree to discourage members of the society living away from our city.

I have realized for a long while that it would be instrumental in encouraging the enthusiasm of our members by holding our meetings away from New Orleans at times, and to that end I worked in conjunction with citizens of Morgan City to secure their city as a meeting place last year, and we had the most encouraging annual meeting held since my connection with this society. Last year I worked with Dr. Barry to secure the meeting for Alexandria, and the results show for themselves. We are now, I believe, in the midst of the most successful meeting of our career, and I wish here to thank the good citizens of Alexandria for their moral and financial assistance which has made this meeting possible.

During the past year a vast amount of good has been accomplished through the activities of our members, the greatest of which was to have the School Board of Orleans Parish consent to the examination of the mouths of the public school children.

These examinations have proven so successful that I trust through the efforts of our component societies, these examinations will in the future be held in every public school of our state. Our councillors should leave nothing undone to accomplish this end.

Other conditions also confront us, conditions of a serious nature, which deserve the most careful consideration of the members of our society. First of these is to stop the illegal practice of dentistry throughout our state. Our state law is ample, and sufficiently clear to protect us from this condition. The great trouble is lack of co-operation in this matter. Some of us fail to act in matters of this kind, fearing that we may be criticised for taking legal steps to put an end to illegal practice. Others neglect to act through sheer lack of interest.

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*Read before the Louisiana State Dental Society, 1912.

Neither of these conditions should exist, as it is eminently unfair to the public as well as to the dental profession to have incompetent persons attempting to correct conditions which may exist in the mouths of the mothers, fathers and children of our state. Many serious conditions have arisen through such practice, and it is our duty to do all in our power to put an end to it.

Another matter which should be handled by this body is to amend the existing law regulating the practice of dentistry within the confines of our state. The existing law is defective in many respects, the most serious of which is that the State Board of Dental Examiners is authorized to formulate its own by-laws which govern every act.

I wish it to be thoroughly understood that I am not here to criticize the present Board, for I feel and am sure that they have acted both honestly and judiciously, but at the same time this Board cannot perpetuate itself. According to Section Two of the state law, our governor shall appoint this Board of five members, and also fill all vacancies occurring thereon. This section in itself is palpably wrong for reasons following:

It is quite possible that in years to come we may have that which I hope we never shall have—a governor who would be influenced by either petty politics or kindred matters to appoint incompetent men on this Board. For example, some ten or twelve years ago, one of the governors of Mississippi appointed on the Mississippi Board a young gentleman, a non-graduate, and this particular gentleman proved to be the first charlatan in that state, and this occurred during his term of office as a member of the Examining Board, and furthermore this same gentleman is today conducting a "dental parlor" in the city of New Orleans. Now, fellow members of the Louisiana State Dental Society, I ask you: "Would you like to have your son, brother, or friend submit to an examination, to qualify as a practitioner of dentistry before such an individual?" I am quite sure that your answer is NO, and that you wish that you could vote more than once.

Gentlemen, we now have at the head of our state government one of the greatest and most fair-minded gentlemen who has ever occupied this exalted position, and I feel that the time is ripe for us to so amend this law to read, that said Board shall be composed of five members, to be appointed as follows: The Louisiana State Dental Society shall submit to the governor the names of ten reputable practitioners of dentistry from which list the governor shall appoint said Board.

Again, as the law stands today, the Board has the power or right to pass by-laws by which a non-graduate or a graduate of an unrecognized college may be examined if members of the Board see fit: and this condition is palpably wrong; and again, the Board is authorized to pass upon colleges of this state, as regards their recognition.

They may pass upon such a college with the most careful consideration, and then place it among the recognized colleges, and advertise it accordingly; but such recognition would apply only to the state of Louisiana.

In order for a diploma from a college of dentistry to entitle a graduate to examination before all states in the Union, his diploma must issue from a college recognized by the National Association of Dental Faculties, and to be so listed.

I now wish to thank this, the Louisiana State Dental Society, for having seen fit to honor me to serve you through the past year as your president, and trust that through my honored successor, whomsoever he may be, that some of the suggestions which I have made, as well as ideas of his own, may be effectively carried out.

# BACTERINS AND BACTERIAL VACCINES IN THE TREATMENT OF CERTAIN LESIONS*

BY ADOLPH BERNARD, D. D. S.

THE SUBJECT MENTIONED, as selected for presentation at this meeting, would be much more easily and satisfactorily handled through the medium of a clinic, wherein the details and final results would speak unerringly for themselves, if it were possible to obtain the patient upon whom the demonstration could be depicted, with more ease and accuracy, as well as satisfaction, than is possible in a paper wherein the results of the experience of the writer is related only.

In the absence, however, of clinical material we shall relate as briefly as possible the history and management of a few cases which have been handled successfully with the bacterin and bacterial vaccine, and serum therapy.

As a premise, however, it may not be amiss to give a synopsis of the theories and origins, which have led to the successful application of serums and vaccines in the warfare we are conducting upon disease.

## IMMUNITY IDEA.

Pasteur and Chaveau advanced the idea that the animal body was a mere culture medium for the growth of micro-organisms, and that immunity was produced when the food upon which the bacteria was nourished became exhausted, or when the body became choked with bacterial products which checked their further growth.

Metchnikoff advanced the idea of body resistance to bacterial invasion through his leucocytic theory of the mechanical and metabolic destruction of disease-forming agents which function was already known by the ameboid movements of the leucocytes which enabled them to take within themselves foreign particles, ingesting and digesting them.

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*Read before the Louisiana State Dental Society, 1912.

Virchow was aware that the number of leucocytes was enormously increased in the region where septic matter was present, and some investigators have called the leucocytes scavengers; Panun and Reser found the ingestive and digestive power of the leucocytes to be true and called them phagocytes, which doctrine is adhered to to the present.

Further study by this great researcher, Metchnikoff, resulted in the elaboration of his theory as follows:

He states that the cells destroy the bacteria they incorporate by the enzymes contained in their cytoplasm and produced by their own synthetic processes. If these enzymes are in the cells and the cells take up the bacteria, the latter are destroyed therein by the enzymes; if the enzymes are liberated by the destruction of the cells (Phagolysis) it is obvious that the tissue juices which have taken up the products of cellular disintegration become endowed with the solvent powers originally possessed by the cells themselves. Thus Metchnikoff's idea of phagocytosis no longer means only the incorporation of the bacteria by the cells, but includes all the reactions involved in the phenomena of immunity referable to chemical products formed by and commonly contained within the cells, and capable of acting upon infective agents wherever they happen to meet. It is believed that these enzymes destroy not only the bacteria, but their products as well, so that this process may mean either destruction of the bacteria themselves or their products.

Metchnikoff and his co-workers make no distinction between the enzymes, or rather the different classes of these juices, present in these activities. They consider it probable that it is the same agent that does the destroying and neutralizing of their products, thus reducing the hypothesis of the phenomena of immunity to a simple chemical reaction, as it is found that the processes of immunity do not always depend upon the same fundamental reactions.

It may mean the incorporation and destruction of the bacteria by body cells, or upon the destructive action of the body juices, into which the cellular enzymes have been discharged, or when micro-organisms are not directly engaged in the production of disease, and the morbid changes result in the production of a toxin, or its presence, such as diphtheria and tetanus. Here neutralization may depend upon these enzymes or the poison introduced (McFarland). Thus according to this theory diphtheria antitoxin must protect either through the cellular enzymes it already contains or by stimulating the formation of protecting enzymes within the body (McFarland).

### EHRLICH'S SIDE-CHAIN THEORY OF IMMUNITY.

Ehrlich's hypothesis is based upon the mechanism of cellular nutrition and as pointed out by Welsh the two theories have a common viewpoint.

Ehrlich conceives the structure of protoplasm to be extremely complicated and characterized by numerous side-chains or groups of combining molecules, a conception based on the principle of a diagrammatic sketch in organic chemistry. These side-chains being a definite molecular group, are supposed to have definite combining affinities; it is through appropriate molecular groups with other particular affinities in the tissue juices that cellular nutrition and metabolism are maintained.

These side chains are called "receptors," and cells have receptors not only for substances that are beneficial to them but also for matter that tends to destroy them. It is through these receptors that bacteria, by means of their toxins and other metabolic products, attack the cell.

When a cell has thus been set upon and injured, the repair powers of the body exercise their function; and one evidence of repair is the production of more receptors. As nature is prodigal in all her reparative processes, an excess of receptors is manufactured, and some are crowded out into the blood and tissue juices. A large number of these receptors floating in the serum constitute the anti-toxins and anti-bacterial serums. Behring it was who, in 1892, first called attention to the discovery of anti-toxins for tetanus and diphtheria, and thus first arose the idea of chemical immunity. As a sequel to this came the discovery of passive immunity produced by the introduction of a specific anti-body from the serum of an immune animal into a normal one.

### WRIGHT'S OPSONIC THEORY—DOUGLASS.

Wright, in 1903, found that both the formed elements of the body and the body fluids are almost equally important. The leucocytes ingest and destroy infecting bacteria, but are only able to do this after the latter have been properly prepared, or acted upon by some substance in the blood. These substances which so prepare the bacteria for their ingestion by the leucocytes are called opsonins. This idea is carried out upon the basis of phagocytosis, and this is in turn dependent upon opsonins, and the percentage of immunity possessed by the body is called the Opsonic Index.

Sajous and others have advanced the theory that the protective substances in the blood are the products of the secretions of the thyroid, adrenals, and pancreas; and that it is these which endowed the blood and Metchnikoff's phagocytes with their immunizing power. He also claimed that Wright's Opsonin was the thyroid secretion. The researches of Fassin, in Belgium, and Stepanoff and Marbe, at the Pasteur Institute, favor Sajou's observation. Sajou's theory is that bacterial vaccines excite the centers that govern the above glands, and that by stimulating the secretory activity of the latter, cause the appearance in the blood of the protective substances to which Wright refers.

The above gleanings from the sources above mentioned are sufficient without going into the many details and particulars which are now available to further elucidate the subject under consideration, which could well occupy many volumes. Suffice it to say that actual experience has demonstrated the soundness and feasibility of the enunciated doctrines above.

The following cases which have come under the observation of your essayist and the results will show almost conclusively the beneficial outcome of an adherence to Pasteur, Metchnikoff, Wright, Ehrlich and others.

### ENUMERATION OF CASES.

Case 1. Young married lady suffering from an acute alveolar abscess, the incipiency of which was, of course, a violent infectious pericementitis, which, under the care by her first attendant, allowed the infection to develop into the first stages of pus formation, when a medical practitioner was called, and finding the infection of such a virulent character, made a diagnosis of possible tetanus, and accordingly administered the tetanus antitoxin, which being an antigen in itself had some beneficial effect; but as the invading bacteria had an affinity of another kind, the virulency was again manifest the next day, when your essayist was called in with the physician. The diagnosis was plain, being an incipient alveolar abscess, mixed infection, streptococcus and staphylococcus. The mixed bacterins were given, with sufficient opium per mouth to relax the nervous system. After the lapse of probably one-half hour the patient was resting well and slept soundly, without any further manifestation of the local infection.

Case 2. A young gentleman, suffering from a chronic pericementitis, due to a dead tooth, caused by traumatism incidental to a gold filling. The infection here was plainly that usually attendant upon pulp disintegration, and an opening into the pulp chamber and canal was made for the purpose of sterilization, but the advance and course of the invading bacteria was not checked entirely, though apparently so at first, with the destruction of all putrescence in the root canal. But after the lapse of ten or twelve hours the writer was called at a late hour of the night to see the patient, who had just had a chill, and the local inflammatory process had become alarming to the patient and his young wife.

Examination disclosed a mixed infection, and a diagnosis of erysipelas was made, and the mixed bacterins of strepto, staphylo and the bacillus cilli (Van Cot) was immediately given, with the results that the young man immediately went to sleep, and the progress of the infection was arrested entirely at that point and patient was well in two days.

Another case was that of a young lady who developed an acute pericementitis due to pulpal infection. Owing to the painful condition of the tooth she refused to allow an opening into the pulp chamber or an extraction. The temperature was 103° and the infection was rapidly extending. A recourse to the strepto-bacterin was had, and after a few hours the virulency had subsided and the patient became well without any further suffering.

These are a few cases among many that have succumbed with gratifying accuracy to the serum and bacterin treatments which have been handled by your essayist.

# REPORT OF COMMITTEE ON EDUCATION AND ORAL HYGIENE*

BY W. T. JACKMAN, D.D.S., CHAIRMAN, CLEVELAND, OHIO

The record of another year is made. Your Committee on Education and Oral Hygiene begs leave to submit the following report:

Your committee has been as active as conditions would permit. The chairman of this committee offered a resolution before this body last December calling for an appropriation of $500.00 for the use of the committee for 1912. This resolution was unanimously adopted. The Board of Directors, later, cut the appropriation to $250.00. This, of course, hampered the committee in its work. Ever since oral hygiene has become such a potent factor in the work of this society, the year 1912 was the year when the appropriation should have been increased, rather than cut in two. We had been working for years to get material, scientific material, something that would arrest the attention of the physicians of the state. When the material arrived the funds were wanting. We used what funds were appropriated, and a little more, in sending our information to heads of schools, school teachers and dentists, as well as filling orders for examination blanks, cards, etc.

The following represents some of the work done by your committee:

Lectures have been given at Chagrin Falls and they are getting ready to examine their school children.

Warren has had lectures and have examined their children. Sent them 5,000 examination blanks, also cards to advertise the lectures.

Dayton examined their schools during the year. Sent them 40,000 examination blanks.

Sent Zanesville 7,000 examination blanks.
” Dresden, 600 ” ”
” Lisbon, 1,200 ” ”
” Elmore, 1,000 ” ”
” Lancaster, 5,000 ” ”

Sent 2,100 booklets, descriptive of the work accomplished with the Marion School Test Class, to the heads of the schools throughout the state; also sent 200 to the Hocking Valley Dental Society. (Here reports were read from Drs. Martindale, Zarbaugh and Acker.)

Lectures were given in various places over the state. Quite a number of lectures have been given in Cleveland during the year. Have had no report from Cincinnati, but according to the program she will present an exhibit of her own which will show what is being done.

Now, my friends, don't forget that this society owns a stereopticon and slides, which are for use anywhere over the state. The committee recommends the purchase of a moving picture film, such as has been shown at this meeting. This film can be used by the component societies and, we believe, will be very helpful in an educational way. All great movements must have, necessarily, small beginnings. The education and oral hygiene movement, greater than which none has originated in dentistry in many years, had a small beginning, having been conceived by a few and their conception presented to local societies. Out of this growth has come the larger National Mouth Hygiene Association, an association of unlimited possibilities for good, if the dental profession will lend its moral support, which it is doing, and its financial support, which it must do if the movement is to make the rapid progress it should. We, therefore, earnestly recommend this movement and ask you to help make it practical by becoming a charter member, which will cost you $5.00, or an active member only, which will cost you $1.00. We recommend you become a charter member.

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*Proceedings Ohio State Dental Society, 1912.

Many inquiries are coming in and, on the whole, the work is in a very encouraging condition.

After having held the chairmanship of this committee for a number of years, your speaker must say that the burden of this work must now fall on other shoulders.

Permit me here to suggest that we appropriate all the treasury will permit for the use of future education and oral hygiene committees in carrying on this excellent work.

Faithfully Submitted,
Lyman L. Zarbaugh,
E. W. Martindale,
W. T. Jackman, Chairman.

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Toledo, O., Nov. 29th, 1912.

Dr. W. T. Jackman, Cleveland, O.

My Dear Doctor Jackman:—For your report I will say that six school lectures have been given in this part of the state and one lecture before the Glenwood Parents' Club the past year.

Starting soon after the first of the year, an active educational campaign will be made by the Oral Hygiene Committee of the Toledo Society, employing the motion picture and educational newspaper articles, extending over a period of several weeks.

The free dental clinic is on a good solid footing and in charge of an A1 man, who is paid by the Toledo society and associated charities.

Oral hygiene is preached in the clinic, and one of the conditions is, that for the treatment the patients *must* practice oral hygiene.

An effort will be made to inspect the teeth of school children in at least six buildings, after the educational campaign has been made.

L. L. Zarbaugh.

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Columbus, Ohio, November 29th, 1912.

Dr. W. T. Jackman, Cleveland, Ohio.

Dear Doctor:—Have just received your letter, asking for a report from me. While I have not seemingly accomplished much, I have made

Locally we have maintained the free dental clinic and have taken care of 125 cases since the first of December, 1911. By this we have put their mouths in good condition and given each child a tooth brush.

I have given a number of lectures in schools, to clubs and societies and through the "Human Progress" columns of *Columbus Dispatch* have reached thousands with something enlightening on the how and what is being done. Outside of Columbus I have lectured in Circleville to about 1,500 seventh and eighth grade, high school, parents, teachers and a wide awake woman's club. Lectured in New Lexington to the dental society (Hocking Valley).

Have given our instruction to the dentists of Zanesville, Marion, Plymouth, Rehwinkle Society, touching a number of small towns in their jurisdiction. Just recently the school board here has appointed a physician as health inspector and two nurses to assist him, and their work is already creating a demand for more dental attention, and I predict that the time is not far distant when Columbus will also have a dentist added to this corps of health guardians.

Yours faithfully,
(*Signed*) E. W. Martindale.

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Cleveland, O., Nov. 29, 1912.

Dr. W. T. Jackman, Cleveland, Ohio.

Dear Dr. Jackman:—A special exhibit for use of the Cleveland Health League, besides an appropriation of $50.00 toward this work, was made through the Oral Hygiene Committee of Cleveland Dental Society. The exhibit consisted of placards mounted on frames that showed in concise language:

(a) The needs of mouth cleanliness on the part especially of school children; (b) the dangers of disease infection through unclean mouths; (c) instruction on care of the teeth, with enlarged photographs, showing methods of cleaning the teeth properly. These have been on exhibit for periods of two weeks at a time in many different sections of the city, both in the poorer and middle class residence districts and twice in down town business districts.

Lantern slide lectures were given one night at many of these halls. Other lectures were given at the Y. M. C. A., High School of Commerce and Nottingham schools.

An interest in a moving picture film has been purchased for the use of lectures under the board of educations at school auditorium, and dates have been arranged with the Social Welfare Committee.

A dispensary for poor children is operated by the West Side Dental Dispensary, an association largely of Cleveland Dental Society members, for instruction purposes, graded for use in Cleveland schools, is under way. The medical inspection department of the Cleveland schools is co-operating with help of their nurses to bring needy children to the clinics. The nurses of the Methodist Episcopal Deaconesses are giving service in the clinics. The municipal authorities, both of the health board and school board, are favorably disposed toward taking over the work of inspection and dispensaries as soon as the finances will permit, which will be with little doubt early in the year to come. The Cleveland society has raised a fund to continue the lectures and exhibitions. The outlook for larger results after three years of up-hill work in Cleveland is very bright.

Respectfully submitted,
(*Signed*) FRANK ACKER,
HARRIS R. C. WILSON,
J. R. OWENS,
O. H. Com.

## PRACTICAL DEMONSTRATION OF INSPECTION OF SCHOOL CHILDREN'S MOUTHS*

BY G. E. HUNT, M.D., D.D.S., INDIANAPOLIS, IND.

Dr. Hunt explained, as the examination proceeded, that this inspection was conducted for the sake of ascertaining the needs of the average child attending school, of dental services. He demonstrated, by the aid of a corps of assistants, how inspections are made, what record of each case is made, and how each individual child, is instructed to seek dental service, and is furthermore instructed as to the proper care of the teeth. At present there is no established dental clinic for the benefit of children unable to pay for the usual dental service, but the promise is that in the near future such a clinic will be established, following the precedent of larger cities.

After the formal duties of this examination had been completed, Dr. Hunt addressed the children in a felicitous little speech, which elicited laughter and applause. His address follows:

Dear Children:—I am going to give you a little entertaining talk while this examination is in progress. I shall try not to be too serious. Now, I want to know: how many of you washed your faces this morning? (Hands up.) Now, again, and let us remember to be honest: how many washed your teeth? (A few hands up.) Well, I presume all of you girls want to be good-looking, and possibly some of you boys, too, although just at present I suspect you boys do not so much care about such trifles. But mark my word, the time is coming when you, too, will care whether you present a pleasing appearance in society or not.

Now, you girls: do you know how much your good looks, in the not distant future, are to depend on the care you now take of your teeth? If you let them go on and decay, after a while you will begin to show a row of decayed teeth, which will mar your looks and cause you deep mortification. Don't you realize that?

But that isn't the only consideration; in the first place you should take care of your mouth in order to avoid the pain people have who neglect their teeth. You know having toothache is not very pleasant. Some of you perhaps have a strain of German blood in your veins, and the result is germs (laughter), and others have Irish blood, and that stands for the ire you experience when your germs make a tooth decay, and aching results (laughter).

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*Proceedings Indiana State Dental Society, 1913.

The way that decay happens may be likened to the process of enlargement of a hole in your stocking. Mother gets out her needles and yarn, and puts your stocking on a ball, and then she proceeds to—I don't want to set an example of using naughty words, especially before you girls, but she proceeds to darn the stocking (laughter). She perhaps finds only a small hole, in one, and she says to herself, "Oh, well, I'm in a hurry today; I'll just let that go until next time." Then when she comes to examine that stocking, next washday, she finds that small hole has become a big one.

Now, precisely that is what is going to happen to your decayed teeth, if you keep putting off and putting off having them attended to. You had better neglect washing your face than to neglect using your toothbrush after each and every meal.

Just to show you how important this care of the teeth seems to a lot of other people besides us dentists, I want to tell you that Connie Mack, manager of the Philadelphia baseball club, employs a dentist expressly for the purpose of keeping the teeth of the members of his ball team in good order. The first thing a new recruit to his club is required to do is to visit the dentist to have his teeth put in first-class order. You see Connie understands quite well enough that he need not expect good playing from men who may have toothache any minute.

That shows the wisdom of the Philadelphia manager. And the same thing holds good with you boys; you can't play a good game of ball when you have a decayed tooth aching. Besides all that, a lot of decayed teeth showing in your mouth, every time you talk or laugh, is unpleasant to everybody looking at you. You stand a better chance to get a position, if you are seeking one, if your teeth show that you have been painstaking and have kept them from decaying, than if you have let them go, giving no heed until they are all decayed and unsightly. So, too, I say of you girls; you are more likely to get an engagement when you go to apply for a position as stenographer, or any other position, if you have a good, presentable set of teeth. It counts for a great deal more than you might imagine.

I haven't a doubt your teachers will bear me out in the statement that poor teeth keep pupils from school, cause irregular attendance, more than any other one thing.

We are now going to show you a motion picture film called "Toothache." I want you to take particular notice of the closing scene in which a family is shown using tooth brushes. If you will watch their motions you will get a correct idea of the manner of using a tooth brush.

# THE FOURTH INTERNATIONAL SCHOOL HYGIENE CONGRESS.

BY E. W. MARTINDALE, D.D.S., COLUMBUS, OHIO.
CHAIRMAN EDUCATION AND ORAL HYGIENE COMMITTEE, OHIO STATE DENTAL SOCIETY.

THE DENTAL PROFESSION of the world has recently been greatly honored by the place accorded it on the program and the interest shown by educators from all parts of the civilized world in the Fourth International School Hygiene Congress held in Buffalo, August 25-30th. In all of the sessions of a dental nature there was the greatest interest manifested.

This was one of the most important opportunities ever presented the profession in its history for the purpose of presenting the many phases of mouth hygiene in their true relation to hygiene in general. At this meeting there was assembled the largest number of able professional and educational men and women ever gathered in this country for the purpose of considering those questions which deal with school hygiene. Not only the leading educators and school officials of this country, but of the world, were assembled on this occasion, some of the most notable to be mentioned who participated actively were Dr. Charles E. Elliot, Dr. Lewis Terman, Dr. F. Park Lewis, Dr. G. Stanley Hall. Over 450 persons contributed to the program, which lasted the entire week. The meeting was grouped into eight sections and sub-divided into forty-six sessions and a number of general sessions.

Not alone were prominent dental educators and authorities placed on the part of the program allotted to the dental profession, which was no small part, but they were also found quite frequently on the parts devoted to the medical, school and home hygiene divisions. Of the many subjects presented on the program were: "School Buildings and Their Equipment," "Fatigue and Nervousness in School Children," "The Exciting and Contributory Causes of Disease and Physical Defects in School Children," "Status of School Hygiene and Methods of Instruction in City, Village and Country Schools," "Mouth Hygiene," "Sex Hygiene," "Mental Hygiene and the Hygiene of the Mentally Abnormal Child," "Medical Inspection," "The Conservation of Vision," "School Hygiene in Relation to the Home and the Community."

The exhibits were many and very interesting and educational and covered every subject imaginable in connection with the child and school, and represented most all countries, states and cities, and a great many rural points. The importance of dental inspection and attention to the school child never received a higher rating by the most enthusiastic leaders of the dental profession than they received from all sections of this notable School Hygiene Congress. It was a highly esteemed privilege of the writer to meet and converse with many very prominent men and women on ways and means and results accomplished along the lines of dental education and oral hygiene, among those to be mentioned are Dr.

Josephine Baker, of the Department of Health and Child Hygiene of New York City, a woman unusually well qualified to speak and teach on this very important work, and one who has accomplished much. The dental profession as it was represented surely made an impression worth while and gained a well deserved place in the front ranks of the grand march forward to abolish the evil results of so many preventable diseases and miserable lives of our coming men and women.

It was also the good fortune of Chairman of the Ohio State Dental Society Committee on Education and Oral Hygiene to make arrangements with Dr. E. F. McCampbell, Secretary of Ohio State Board of Health, that the dental phase of health be presented in the traveling exhibit which was first shown at the State Fair Grounds all of fair week, in the nature of the moving picture films known as ''Tooth-ache.'' This was done while in Buffalo and was accomplished through the kindly attitude of this very wide-awake Secretary of the Ohio State Board of Health, who believes in seeing Ohio lead. This exhibit will be shown along with others on tuberculosis, school and home, farm and dairy, in towns and cities throughout the State free to all who will come to see. With such a splendid opportunity to educate the people I appeal to the dental profession of the State of Ohio to wake up and help prepare the ground for the good seed which will be planted, and don't be so ready to let the other fellow do it. But, let every component society have a wide-awake committee on Education and Oral Hygiene, and Publicity or it will be to our lasting disgrace.

Since this great Congress I have received a number of letters from almost every section of the State appealing for something to help on the subject of the teeth—how to care for them, etc. With receptive people among the laity, as indicated by these letters, how can we keep still?

No. 50 Ruggery Bldg.,
Columbus, Ohio.

## A PROMISE

A promise made is honor pledge, and to break it is to weaken the entire structure of character. Confidence between men rests on the belief that promises will be fulfilled. The surest way to establish a good name and retain principle and honor, is to keep every promise made, even though embarrassment and loss come to you in so doing. —*H. E. Bown.*

# EDITORIAL

## DENTAL CREDITS AND OTHER THINGS

I wonder if the "spirit will move me" in just the right way to say just the things that I want to say in just the way that I want to say them—in a helpful, wholesome, brotherly sort of way, so as not to be misunderstood. I seek not to blame, not to criticise nor find fault, but to help, to make some things easier and life generally, which is hard enough at best, a little more livable, a little less irritating.

The dental business is comparatively new to me. I came into it after some twenty years spent in active connection in managerial positions with some of the largest manufacturing and mercantile concerns in the world, one of which did an actual cash-with-order business of $20,000.000 the last year I was connected with it, and the others were equally prominent in their respective lines.

This is said not in any boasting spirit, but simply to show my readers that the eyes through which I saw the dental business were experienced eyes, eyes that saw below the surface of things, maybe; eyes, anyhow, that knew what they were looking for and were able to recognize it when seen.

Those eyes saw many things new and strange and unexpected; among other things, saw credit extended to dentists, apparently without limit, on costly goods upon which the margin of profit was very small, almost meager in some lines, upon no tangible basis whatever, resting solely upon what is called in business generally "the moral risk," which means simply upon the willingness of the customer to pay his honest debts, rather than upon the ownership of property that would be available for the payment of debts under any circumstances. To the credit of the profession let it be said that this credit, extended by dealers in dental goods, upon no other basis than the good will of the debtor, is not very often abused; yet sometimes it is treated in such manner as to lead the observer to conclude that it is not appreciated as it should be; as the most valuable asset that the dentist has.

In no other line, so far as I know, do beginners owe so much to the leniency of those from whom they buy goods; in no other line can a young man secure such a long line of credit, upon such easy terms, often extended time after time to suit the needs or convenience of the debtor. I wonder how many dentists remember this, when, in later life, the house to which they owe their start, finds it necessary to remind them, with some emphasis at times, that bills must be paid within certain well-known limits of time?

The men who own and operate dental depots must work within certain established lines as to the payment of bills if they would retain their own credit; and, without that credit, modern business operations would be wholly impossible. These men are subject to the same laws as are those who owe them. Therefore, if dentists would try to understand them, try to put themselves in their places, it would seem that greater effort would be made to comply with their very reasonable requirements as to the payment of accounts.

Of course, your supply house wants your orders; for the purpose of making the buying of your supplies as easy and convenient for you as possible, traveling men are sent out, at great expense, who carry extensive stocks of the kinds of goods that you are most likely to need, and your convenience is consulted and deferred to in many ways. Among the concessions made is that of credit; and, so long as this concession is not abused, the dealer can go along year after year, carrying your account; but this cannot be done unless bills are paid when due.

Just consider your own business: suppose that your patients ask you for credit, or take it without asking; suppose that when you need money and ask for it, no attention is paid to your request for payment; suppose that you learn that some of your delinquent debtors are paying cash for services rendered by some competitor of yours in your own field. What would you think of that kind of treatment? How would you feel about it? Well, dealers are men, too; and they feel just about as you would.

Suppose, again, that you had requested payment from such a patient, not once, but several times, as kindly and as politely as you know how, and had tried to make him understand that you needed the money; that you were borrowing money to keep things going, and paying for the use of it, just because he and a good many others like him had neglected to pay when payment was due, even a good deal past due; and suppose that, instead of paying his bill, or part of it, or, at least, explaining to you why he was unable to pay you, he should simply ignore your request, or if he paid any attention to it at all, write and abuse you. What would you do? What would you feel like doing, whether you did it or not?

I often wonder if dentists who do not pay ever think what might happen to them, if some time or other the dental dealers should organize a little credit department just among themselves, as is so frequently done in other lines, and report to each other every such case, giving full particulars of their experience in trying to collect money due; and that, following such report, every dealer should refuse further credit. Wouldn't that make things just a trifle embarrassing for the dentists reported?

Quite aside from all ethical considerations, leaving all idea of what each man owes every other man out of the question, ordinary common sense would suggest that a man who needs credit, who cannot well get along in his business without it, should do everything in his power to deserve credit and preserve it when once acquired, instead of, seemingly, doing all that he can to forfeit it. Your good name is worth more to you than any other asset, and, once lost, is mighty hard to regain.

In the dental profession a man's good name, and his reputation for fair dealing, prompt payment of bills included, is, usually, his sole "worth" as a business risk. Unlike most kinds of property, such a basis for credit cannot be taken away from him, and cannot be lost except by his own acts. This fact makes such a reputation by far the most valuable of assets, and should be zealously guarded, protected and fostered, and not frittered away by carelessness, lack of promptness, indifference or neglect.

I personally know a dentist who has a fine personality, is well liked by many, has a very fair practice, and who ought to be a leader in his community. Yet that man has so neglected his business reputation that he cannot buy so much as a facing without laying down the money in advance. Too bad? Of course it is; especially as that fact has reacted upon his general character, so that his reputation along other lines has suffered also, until today he bears in face and manner an unmistakable index to his unreliability.

Every man owes it to himself to build up and maintain a reputation for reliability and uprightness; and the prompt payment of business as well as merely personal accounts will go further toward the achievement of that end than any other thing—further, it seems to me, than all other things combined; since unreliability in one direction is a fertile seed that sprouts and grows and spreads until it may choke out all the finer qualities of the man, and leave his old age a barren waste of regrets.

G. E. HARTER.

## NOTA BENE

Every member who receives a copy of this number of THE DENTAL SUMMARY owes to himself the duty of reading every article in it carefully, and thoughtfully. There are enough good things in it to make up several issues of "the common run" of professional publications. Many of the articles have been prepared by men who always have an audience, whether writing or speaking, but all are too good to be overlooked or hastily glanced through; read them all, and you will agree with us that THE DENTAL SUMMARY is the one magazine that no dentist can afford to be without.

Work is the only road to Happiness; without work, life is but a heavy burden to bear. Try loafing once, and you will soon find out.

# OBITUARY

## Dr. Henry A. Smith

Henry A. Smith, A. M., D. D. S., was born February 28th, 1832, at Oxford, Butler County, Ohio. He was the fourth son of Josiah and Diantha Smith, of New England ancestry. At Oxford he enjoyed special opportunities for study of which he naturally took advantage. After leaving school he spent some time in his father's carriage factory, where he gratified an inclination for mechanics. Desiring to travel before fixing upon his vocation in life, he left Oxford and visited various points of interest in the United States, Cuba and Central America; remaining for more than a year on the Pacific coast. Upon his return to Oxford he frequented the office of Dr. George W. Keeley, and by accident rather than design, was led to adopt dentistry as his profession. He attended two courses of lectures in the Ohio College of Dental Surgery, meanwhile pursuing his studies under the preceptorship of Dr. Keeley. In 1857 he received the degree of Doctor of Dental Surgery and for two years thereafter was associated with Dr. Keeley in practice at Oxford.

In 1859 he moved to Cincinnati and associated himself in practice with Dr. Charles Bonsall. Upon the retirement of Dr. Bonsall, Dr. Smith assumed the full responsibility of his practice in the office on Sixth Street. Subsequently he moved to 286 Race Street, and in 1885 erected a handsome office and residence building at 116 Garfield Place. Here he continued in active and successful practice until a short time before his death, acquiring a most appreciative clientele.

Shortly after his graduation in dentistry he became associated with the activities of the Ohio College of Dental Surgery, as a member of its Board of Trustees and as a teacher in its clinical departments. In 1862 he was elected to the chair of Chemistry and Metallurgy. In 1878, in a re-organization of the management of the School, Dr. Smith was elected Dean of the Faculty, and Professor of Operative Dentistry. These positions of responsibility he continued to hold until his death, and under his careful and forceful guidance, the School took its place among the foremost Dental Educational Institutions of the country.

He contributed largely to the literature and research of the profession and was active in State and National Association work.

He was elected President of the American Dental Association in 1882, and at the time of his death was the last surviving member of the body of a dozen men who met at Niagara Falls in 1859 to organize that Association. He was an active member and presiding officer of the Ohio State Board of Dental Examiners, The Institute of Dental Pedagogics, The Mississippi Valley Association of Dental Surgeons, The National Association of Dental Faculties.

In 1862 he volunteered as surgeon for service with the Union Army and served with his regiment in Northern Kentucky. He sustained throughout his life a love for his native town of Oxford, maintaining the homestead and spending many summers there with his family.

In 1894 Miami University conferred upon him the degree of A. M. He was one of the original members of the Queen City Club of Cincinnati and took an active interest in improvements and civic affairs. He was an organizer and officer of the Associated Charities of Cincinnati.

In 1866 he married Lucy Tomlinson, only daughter of James and Eliza Tomlinson. He is survived by the widow, two daughters, Mrs. Campbell Scott and Mrs. Otto Giese, both residents of New York, and by a son, Dr. Henry T. Smith, who, since 1890, has been associated with him in practice and who assumes his college and professional responsibilities. In February 1911 he suffered a cerebral hemorrhage which resulted in confinement to his home, and on Wednesday evening, September 10th, 1913, his spirit passed peacefully away.

His body was interred in the family lot at Oxford. His long life of usefulness is crowned with the affection of his family, the love of his students, the respect of his friends, the appreciation of his patients, and works that live after him.

At a called meeting of the Board of Trustees of the Ohio College of Dental Surgery, the following was read, and ordered spread upon the Minutes of the Board, and a copy sent to the family of the deceased:

In the passing of Dr. Henry A. Smith, Cincinnati has lost one of its best citizens, and the dental profession a leading member.

Dr. Smith received his dental degree from The Ohio College of Dental Surgery in 1857. Immediately upon his graduation he entered into the active practice of dentistry. He was a student, and kept abreast of his profession and conversant with its literature. He soon became one of the most noted practitioners in the city of Cincinnati and indeed in the whole country. His clients were devoted to him, and he was eminently successful.

In 1878, owing to various causes, a re-organization of the Faculty of his Alma Mater became imperative. Dr. Smith was the logical leader of the movement. Although the number of students had not increased, year by year, since the close of the Civil War, producing thus unsatisfactory financial conditions, he knew that the high educational standard of the College had not been lessened, and appreciating its possibilities, he called to his assistance in this work a number of able members of the profession, with the result that it is now one of the most prominent Dental Colleges in the world.

Dr. Smith occupied, at different times, several of the principal chairs in the educational department of the College; was Dean of the Faculty since 1878 and a member of the Board of Trustees since 1869. To his exertions more than to those of any other man is due the prominent position the College now occupies.

He was influential in securing the present law regulating the practice of dentistry in Ohio. He assisted in organizing the American Association in 1859, and was its President in 1882. He was President of the National Association of Dental College Faculties in 1894, and was an active worker in various State and local Societies. He was a member of The American Association for the Advancement of Science, and an honorary member of a number of foreign scientific Societies. In 1894 he received the degree of A. M. from the Miami University at Oxford, Ohio.

Dr. Smith closed an honored and successful career on Wednesday evening, September 10th, 1913, in his 82d year, respected by his professional brethren and acquaintances, and beloved by his friends.

To his widow, two daughters and son, we, the members of the Board of Trustees of the Ohio College of Dental Surgery, extend our most heartfelt sympathy in their bereavement, and deeply feel the loss that we and the College have sustained in his death.

## Dr. Charles A. Meeker

Dr. Charles A. Meeker, one of the best known dentists in the country, died September 8 in the Homeopathic Hospital, Newark, N. J., following an operation. He had been in the hospital several weeks.

Dr. Meeker, who was sixty-seven years old, and who had spent nearly all his life in Newark, was president for one year and secretary and treasurer for fourteen years of the National Association of Dental Examiners; president for one year and secretary for thirty-six years of the New Jersey State Dental Society and for twenty years was a member of the New Jersey State Board of Dental Examiners. He was one of the founders of the American Academy of Dental Surgery.

He was a member of the Museum Association of Newark, the National Arts Club and the Lotos Club, New York City. His wife survives him.

Let your conscience be your religion; if you lack a conscience your acceptance of any established creed will be a farce.

# SOCIETY·ANNOUNCEMENTS

## Indiana State Board

The next meeting of the Indiana State Board of Dental Examiners will be held in the State House, Indianapolis, Nov. 10th to the 15th. All applicants for registration in the State will be examined at this time.

No other meeting will be held until June 1914.

For further information apply to the Secretary,

F. R. Henshaw,
508 K. of P. Bldg., Indianapolis.

## Michigan State Board

The next meeting of the Michigan State Board of Dental Examiners will be held at the Dental College, Ann Arbor, commencing Monday, November 10th, and continuing through the 15th. For application blank and full particulars address

F. E. Sharp, Secretary,
Port Huron, Mich.

## Illinois State Board of Dental Examiners

The semi-annual meeting of the Illinois State Board of Dental Examiners for the examination of applicants for a license to practice dentistry in the state of Illinois will be held at the College of Dentistry, University of Illinois, corner Honore and Harrison Streets, Chicago, Ills., beginning Monday, November 10, 1913, at 9 a. m. All applications, together with fees, twenty-six dollars ($26) must be filed with the Secretary at least five (5) days prior to date of examination

Address all communications to O. H. Seifert, Secretary, 49-50 Ridgely Bank Bldg., Springfield, Illinois.

## To Indiana Dentists

All persons legally registered for the practice of dentistry in Indiana are required under Sec. 9 of the new statute, to register with the Secretary of the State Board of Dental Examiners, *annually*, on or before the 31st day of December. The annual registration fee is $1.00. Blanks will be mailed to each qualified dentist on December 1st.

This act applies to those dentists who have left the state or are now not in practice, the penalty being the revocation of said person's license within 90 days upon failure to re-register. The annual registration certificate is necessary to entitle one to practice.

F. R. Henshaw, *Secretary*.
508 Ind. Pythian Bldg., Indianapolis. Ind.

## Ohio State Dental Society

The forty-eighth annual session of the Ohio State Dental Society will be held in Toledo December 2, 3, 4, 1913, in the Hotel Secor.

An especially strong program is promised, progressive clinics and special features of which complete announcement will be made in the November Journals. Preliminary announcement appears elsewhere in this issue.

It is advisable that hotel reservations be made in advance as we will probably have the largest attendance in our history.

Make arrangements to attend. A view of the complete program will convince you that this will be a meeting you will not want to miss.

F. R. Chapman, Sec'y.

## Southwestern Michigan Dental Association

The next meeting of the Southwestern Michigan Dental Society, Third and Fourth Districts, will be held at Battle Creek on Tuesday and Wednesday, the 18th and 19th of November, 1913. Everybody welcome.

R. A. Bowie, *Secretary.*

## To the D. D. S.

(ORIGINAL)

There is a time, there is a place,
When he looks down into my face;
And how my senses madly thrill—
He "fills" a place none else can "fill."

'Tis then he means to me so much,
Vexations vanish by his touch.
And, though my list of friends is full,
'Tis he alone who has the "pull."

They say he has a lot of nerve,
That his strong arm must never swerve,
His surplus nerve, I think I see
Replenished as he unnerves me

Without him, that dull aching void
But mocks at me, when I'm annoyed
Beyond endurance, by the tricks
Of demons only he can fix

And so let's build an arch prodigious,
To him who builds the little bridges,
And fashion there a laurel wreath,
To crown the man who crowns our teeth.

Sophie E. Morgan,
Oklahoma City, Okla.

# Ohio
# State Dental Convention

## AT TOLEDO
## December 2-3-4, 1913

# The Greatest Meeting Ever Held

## A Program Bursting With Good Things

### Every Essayist and Clinician a Man of More Than National Reputation

**HON. JAMES M. COX, Governor of Ohio.**

**DR. VICTOR C. VAUGHN,** President American Medical Association, Dean Medical Department, University of Michigan.

**DR. EDWARD C. KIRK,** Editor "Dental Cosmos," Philadelphia; Dr. F. T. Van Woert, Brooklyn, N. Y.; Dr. Clarence J. Grieves, Baltimore, Md.; Dr. Thomas B. Hartzell, Minneapolis, Minn.

**DR. SIMON FLEXNER,** Director Rockefeller Institute; Dr. E. F. McCampbell, Secretary Ohio State Board of Health; Dr. Karl G. Knoche, Chicago; Dr. F. H. Skinner, Chicago; Dr. M. J. Thompson, Detroit; Dr. Marcus L. Ward, Michigan State University; Dr. W. J. Greenfield, Wichita, Kansas; Dr. J. H. Prothero, Chicago; Dr. George H. Wilson, Cleveland; Dr. Henry Raymond, Detroit; Dr. M. H. Fletcher, Cincinnati; Dr. Sidney J. Rauh, Cincinnati, Etc., Etc., Etc.

The officers in charge of the program have been vigorously at work, and from the publication below of the program up to the present writing, every dentist will see at a glance there is something in it he does not want to miss. Evidently the essayists selected are of the highest type and these men will furnish real live topics.

Those who are to open the discussion are also well known, and judging from the subjects selected and the men who are to speak on them, there is no doubt that it will pay to go a long way to hear them.

But this is not all; twenty of the best clinicians of the country have been selected. The progressive clinic plan will be followed and each clinician will give a "lecture clinic," which will enable every one to see and hear. Great emphasis will be laid upon this part of the program by the officers, who are sparing no pains or expense to give every member of the Society full value for his membership.

Owing to the great attendance expected, only members of the Ohio State Society, and those from other states who can show that they are members of bona fide Dental Societies, can attend the clinics. If you are not a member of any Society enquire of some one you know, who is a member, how to become one.

The completed program will be published in the November Summary and official programs will soon follow.

# THE DENTAL SUMMARY

The Magazine That Helps

Vol. XXXIII NOVEMBER, 1913 No. 11

OFFICIAL ORGAN

The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office; 195 16th Avenue, Columbus, Ohio
L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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# REGULAR CONTRIBUTIONS

## COMFORTABLE AND DEPENDABLE DENTAL OPERATIONS.*

BY WILLIAM HARPER DEFORD, D.D.S., M.D., DES MOINES, IOWA

THE DENTAL PROFESSION of today bears about the same relation to analgesia as the medical profession did to anesthesia at the time of the breaking out of the civil war. In 1844 Wells discovered the anesthetic properties of nitrous oxid; about 1846 Morton discovered the anesthetic properties of ether, and in 1848 Simpson discovered the anesthetic properties of chloroform. The first public demonstration of nitrous oxid for surgical purposes was a failure and it was several years before it again attracted attention. Only a surgeon here and there was brave enough to administer ether or chloroform, and at the time of the beginning of the civil war there were only about a half dozen surgeons in the United States who did capital operations.

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*Read before the Indiana State Dental Society, 1913.

As strange as it now seems, at so recent a date it was the rule to perform surgical operations without an anesthetic, just as the dental surgeon at the present time operates mostly without anesthetics. There were only two methods in use for anesthesia induction, and these were so crude and apparently ridiculous as to be almost beyond belief. One method was to place the patient on the floor. Three strong men stood on each side of the patient and at a given signal raised the patient rapidly to his feet. On account of the motion being more rapid than the flow of blood to the brain a temporary anaemia resulted, and while the patient was in the condition we speak of as a faint, the operation was performed. The other method was to forcibly seize and compress the carotids with the fingers, an interruption of blood to the brain resulted, and a brief period of anesthesia was thus established.[1] Then the civil war came, and this furnished an opportunity for the employment of ether and chloroform for poor, mangled soldiers on the field of battle, and greater progress was made in anesthesia during the next four years than would have resulted in twenty-five years had there been no war.

Imagine, if you can, a surgical clinic where it was necessary to amputate limbs and remove tumors, and no anesthetic available except the methods just described. Patients had to submit to such methods or continue to suffer till death relieved them without an operation. Horrible as this now appears, the dental surgeon of today, with few exceptions, is doing no better for his patients. Indeed, he is more of a brute, more cruel, more culpable than the medical man who antedated the civil war, because the dental surgeon has the means at hand by which pain can be prevented, but refuses to avail himself of them, while the medical man at that time had not.

We bore into vital dentin, "perform laparotomies upon the teeth," so to speak, the patient suffers, cringes, agonizes almost to the state of collapse and the anesthetic usually employed is that of witty speech or an amusing story, which sounds as cheap to the patient as the silly babble of a barber when he seeks to distract our attention from the effects of a dull razor.

It does seem almost beyond comprehension, when the means is at hand to prevent pain, and the public clamoring for it, demanding it, and will pay any price to obtain it, we go on in the same old way, obtaining inferior results, knowing at the time that the operation falls short of what it should be, and will fail in a few months because we cannot remove the carious tissue thoroughly or cannot prepare a cavity sufficiently well for the proper retention of the filling or inlay, and fail utterly in shaping properly a tooth for a crown because it becomes too sensitive, yet 95 per cent. of dental surgeons continue this line of practice. Many, many times each day operations are lightly passed over and not thoroughly performed because of the fact that the patient cannot or will not endure the pain, or the strain on the operator is greater than he can bear in his attempt to brace up his patients psychically to the point of endurance.

If pain meant no more than the mere hurt at the time, and we could properly cut down to healthy dentine, and could obtain absolutely proper cavity preparation, and could make the patient submit to all necessary cutting, no matter how severe, it might be excusable to continue our present methods, but pain, intense in its character, and even when slight, if long continued, is detrimental to our well being, shatters the nerves, induces neurasthenia, breaks down the will power and enervates our physical being.

Exhaustion of the vaso-motor centers, rather than structural lesions, is what produces shock, and I want to emphasize the fact that it is a dangerous procedure to submit even the physically strong, more so the frail, to intense pain beyond certain limits. Under the benign influence of analgesia or anesthesia, physical suffering is prevented and mental torture obviated. Sir. James Y. Simpson made some very interesting experiments on that most delicate of all plants, the sensitive plant. If you touch the leaves of the sensitive plant, they at once fold up and fall down upon the stalk. Sir. James, who discovered the anesthetic properties of chloroform, found that if you subject this plant to the strong vapor of chloroform the leaves would close up just as if you had irritated them in any other way. But if you apply a very dilute chloroform vapor, you can now handle the sensitive plant, and it does not irritate it or cause it to fold up. The degree of irritation that caused the sensitive plant to wilt in its natural state had no effect whatever when the plant was anesthetized.

The writer has for more than thirty years maintained that to allay pain induced by the dental surgeon in routine work was highly beneficial to the patient. Now comes the news that Dr. Johannsen, of Copenhagen, after an elaborate series of experiments, has given to the market grower an effective method of rapid flower reproduction *based on an intensification of the plant's resting period.*[2] He showed that plants submitted to the influence of the vapors of chloroform and ether were afterwards capable of an astonishingly rapid growth. The French gardeners are now employing this method. When in an entirely restful condition, specimens of lilacs, azaleas, lilies of the valley and other plants are placed in an airtight box. A small vessel affixed to the lid of the box is filled with chloroform or ether and the cover placed in position. Being heavier than air, the vapors rush to the bottom of the box and mingle with the plants. At the end of forty-eight hours the specimens are taken out and grown in the ordinary manner. Nothing in the way of forcing is required, and without the employment of any great degree of heat the plants develop in a most remarkable manner. Lilacs were in full bloom within a fortnight after being placed in the vaporizing chamber, while lilies of the valley were hardly so long in coming to maturity. In no way did the treatment harm the plants, which produced flowers and foliage in profusion. If enforced rest and relaxation will do so much for flowers, is it not reasonable to suppose that to minister to our patients so that they shall not be hurt or feel pain during dental operations, and to banish fear and apprehension of pain, will prove beneficial rather than detrimental?

Several months ago an English physician made the most scathing criticism ever uttered on the inefficiency of dental operations, going so far as to claim that dentistry as he observed it in the mouths of those coming to him for his services was responsible for a condition of sepsis not found in the mouths of those in which dental operations had not been performed, and that leaky fillings, poorly-fitting crowns and abutments, unsanitary bridgework, unremoved salivary deposits located well up on the roots of teeth, was a continual source of both local and systemic infection, and he sounded a clarion cry for cavity preparation that should be surgically correct, for root preparation that would permit of accurately-fitting bands for crown and bridges, and for a more thorough removal of all salivary deposits.

I do not believe there is a man within the hearing of my voice that does not every day fall short of doing what he knows would be better for his patients. We adjust the rubber dam; we map out in our minds the cavity preparation we believe best for this particular operation; we break down the enamel walls with chisels; we remove the soft decay with excavators; we resort to the bur for the removal of less carious dentine and proper shaping of the tooth for retention of filling or inlay, but the tooth becomes extremely sensitive; we cut in a less sensitive direction, but finally it is alike sensitive in all directions, yet some carious dentine remains and the cavity is not the shape that will retain the filling or inlay. Patient is becoming more nervous all the time, the amount of pain well borne in the earlier part of the operation is almost unbearable now. Contortions of the face, and moving backward and forward in the chair, pulling away from the bur, together with verbal protests such as "I am doing my very best, Doctor, but I just cannot stand this any longer." We begin to say to ourselves, "if I can get some retention, enough to retain the filling, I will let that discoloration go; it will probably make no difference." In this way we compromise in cavity preparation, and we fail to remove all carious dentin. Carious dentin bears the same relation to dentistry as carcinoma does to surgery, and the dentist is as culpable who overlooks this condition as the general surgeon who does not do a radical operation in cancerous conditions. We can no more do our work as thoroughly as it should be done than the general surgeon can do his work properly without employing every means available.

Today surgeons in towns of 1,000 population are performing operations that were unknown fifty years ago. The mere tyro in surgery of today is performing operations that only the cleverest of surgeons attempted a few years since. Anesthetics have made this condition possible in surgery and they can do as much for dentistry. Had not the general surgeon employed anesthetics in his routine work, we would be no further advanced in surgery than we found ourselves at the beginning of the civil war.

When dental surgeons generally avail themselves of the kind offices of analgesia and anesthesia in routine work, in a few years we will look back to the class of dentistry now being done and it will appear as crude and unsatisfactory as the surgery at the time of the introduction of general anesthetics by the medical profession.

Comfortable and dependable dental operations can be performed by the aid of general anesthetics. Every general anesthetic with which we are acquainted has both an anesthetic and analgesic stage. These stages differ only in degree. We do not attempt to perform operations in the anesthetic stage until the patient has lost consciousness; we operate in the analgesic stage before the patient has lost consciousness. In the anesthetic stage the patient is not aware of anything that is being done; in the analgesic stage the patient knows exactly what is being done, and assists materially by responding to such commands as, "Open the mouth wider; turn your head towards me," etc., and replies to such remarks as, "Do you mind what I am doing? Are you comfortable? Breathe a little deeper," etc.

We are familiar with the expression "surgical anesthesia." We understand it to be the third stage or degree of anesthesia in which there is complete loss of consciousness and sensation—the usual time to begin a surgical operation. Analgesia implies insensibility to pain; also absence of pain; a form of partial anesthesia. It is a condition of insensibility to pain without the loss of consciousness. The sensation of touch may persist without the sensation of pain. One in a state of analgesia hears what is said and knows what is being done.

Dental operations naturally may be classified as follows, according to the severity of the case under consideration:

*A.* Operations demanding surgical anesthesia.

*B.* Operations demanding surgical analgesia.

In group *A*, those demanding surgical anesthesia, I would include the extraction of teeth, removing vital pulps, entering pulp chambers in cases of advanced acute septic apical pericementitis, usually, and all oral surgical operations as ordinarily classified.

In group *B,* those demanding surgical analgesia, I would include sensitive cavity preparation, shaping vital teeth for crowns and abutments, exposing vital pulps for surgical removal by means of pressure anesthesia or the application of arsenic; removing calcareous deposits in pyorrhea technic, and all other painful operations or nerve-racking operations that dentists perform in their daily routine work.

According to the above classification, the majority of dental operations, those demanding most frequent attention, and occupying by far the greater amount of time by the dental surgeon, are to be found in the second classification—those to be performed under analgesia. In *Oral Hygiene* for January, 1913, I used and defined the term "Surgical Analgesia" as follows:

*"Surgical Analgesia implies a state or a condition of the patient, in which, without complete loss of consciousness, certain surgical procedures may be accomplished without inducing pain; or the pain incident to the operation as ordinarily performed, is held in abeyance to such an extent as to elicit no objection on the part of the patient."*

Surgical analgesia varies in different individuals; with some it is present at the very beginning of the analgesic stage, with others it is absent till we approach or reach the beginning of the light anesthesia stage.

This analgesic stage is ushered in by a sense of warmth or mild stimulation, because of the fact that there is a slight rise of blood pressure and slightly increased respiration, conditions conducive to safety. Most patients quickly recognize a feeling of numbness in the lower extremities extending to the hands, cheeks, lips, gums, and upon snapping the teeth together, a sense of deadness, and they frequently volunteer the expression, "I know you can now operate without my feeling pain, and even extract teeth." In nearly all cases patients will indicate the stage at which they believe painless operating can be done, and after once having experienced this sensation, will accurately estimate the moment at which the operation can begin, at future sittings. Very seldom are they mistaken as to when it is safe to begin operating, and the very fact that they feel that painless cavity preparation can be made at that particular time, exerts a helpful psychic influence very much desired by the operator. I sometimes think the patient feeling himself passing away, not wishing to lose consciousness, takes a chance on being in the proper condition, and surprisingly finds that he is so.

This sense of stimulation is to most patients very agreeable, and recently I had a prominent dental surgeon in Chicago tell me, "I felt all the time as though I wanted just a little more." Inquiring of a patient as to an expression on her part as to the difference in feeling while having the extreme ends of some upper molar roots scaled, at first without an analgesic and then under analgesia, she replied, "I could have but two teeth operated on at a sitting without the analgesic and it was extremely painful, but in the analgesic state six teeth were operated on at one sitting without a particle of pain, and the sensation experienced was positively pleasing."

It is very desirable that these operations be performed in the stage of surgical analgesia rather than that of light anesthesia. In the stage of light anesthesia respiration is deeper and quicker than normal, and heart action excited, hence patients are more apt to become excited, and having passed into unconsciousness, cannot assist the operator to the same extent that a patient can who responds to such demands as, "Turn your head towards me," "Elevate your chin," "Swallow," etc.

The moment consciousness is lost, the light anesthesia stage is present, patients no longer understand what you are doing, become confused and alarmed, move about enough to discommode you, laugh or cry because they are experiencing excessive stimulation. Either operate in the surgical analgesic stage or push on to the anesthetic stage, as the light anesthesia stage is not conducive to comfortable or successful operating for either the patient or the operator.

All general anesthetic agents have their analgesic stage just as surely as they have their anesthetic stage. Analgesia can be induced by the inhalation of nitrous oxid, somnoform, ether, chloroform, ethyl chloride. ethyl bromide and other agents not so well known, but for dental purposes I believe that nitrous oxid and somnoform are superior to all other general anesthetics.

The requisites of a good anesthetic are:

1. Safety.
2. Freedom from disagreeable and dangerous effects during and after administration.
3. Easy and rapid production of effect.
4. Easy and rapid recovery.
5. Simplicity of administration.

Safety is the first requisite in selecting an anesthetic agent, and statistics show that in the matter of safety, nitrous oxid and somnoform are far less dangerous than other general anesthetics. The death rate for these anesthetics is only one in several hundred thousand administrations.

With a mortality record such as I have stated for nitrous oxid and somnoform for cases of *surgical anesthesia, how much safer these agents must be when used only in the analgesic stage,* patients at no time losing consciousness. And bear in mind, please, that these figures include nitrous oxid and somnoform administrations from the very beginning, when the appliances were most crude and unscientific, and those using them had no previous knowledge of anesthetics, relying for the most part upon the printed instructions that accompanied the appliance.

Other things being equal, the anesthetic agent most pleasant to inhale, most free from disagreeable effects during and after administration, is the one to be preferred. In nitrous oxid and somnoform we have agents which, with the newer appliances, can be administered so gently as to be almost undetected. Should these, however, prove objectionable to the fastidious or the elite, or the patient imagine them so, a few drops of essence of orange will completely disguise the aroma from these agents, and even the disagreeable, penetrating, nauseating ether odor can be completely covered up by a little essence of orange.

Easy and rapid production of effect, when this can be done safely, and easy and rapid recovery are greatly to be desired. With nitrous oxid and somnoform deep anesthesia can be induced in from thirty to forty-five seconds, and usually in a minute or two after returning to consciousness, all effects of the anesthetic are gone. In extracting cases, by the time the mouth is freed from blood the patient is usually ready to leave the chair.

Simplicity of administration is a most important feature. There is only one anesthetic more difficult to administer than nitrous oxid, namely: nitrous oxid and oxygen. Nitrous oxid is a good anesthetic, and it will accomplish all that is claimed for it by its most enthusiastic advocates, and failures result from its use simply because men have not the patience and perseverance to stay by it till they learn how. Anesthesia induction from pure nitrous oxid is of too brief duration for the average dentist, and analgesia cannot be induced by it without the admixture of air or oxygen, and when we add oxygen the process becomes even more complicated. We now have to deal with two gases instead of one, and the proportions must be preserved and maintained, and the pressure behind them must be constant, and it requires more patience and perseverance and skill than to administer nitrous oxid alone, but it is time well spent to learn this accomplishment.

Somnoform is the easiest of all anesthetics to administer. Men who make most dismal nitrous oxid failures experience little or no difficulty in inducing somnoform anesthesia and analgesia. The appliances used for somnoform administration are very much less complicated than nitrous oxid appliances, much easier to manipulate, weigh less than one pound, and the somnoform comes in convenient glass capsules, a dozen of which, including the container, weigh less than half a pound and can be sent by parcel post. With somnoform, anesthesia and analgesia can be induced without the admixture of oxygen, air dilution being all that is necessary. In the technic of analgesia induction, suggestion plays a large part. Patients in the analgesic stage are very susceptible to all forms of suggestion, both visual and verbal. Those of you who have seen only public clinical demonstrations of anesthesia and analgesia have not the slightest conception of what can be accomplished in the quiet of an office, with only the regular assistant present, clothing of the patient properly arranged, the surroundings conducive to cheerfulness and optimism.

Visual impressions or suggestions are the first to be received upon entering an operating room and the surroundings should be such as not to alarm or disturb the patient. So far as possible all instruments and appliances should be concealed. Remember the slightest nervousness or hesitation on the part of the operator will be detected psychically by the patient, and produce an adverse effect. *To be successful in inducing surgical analgesia one must be masterful, must completely dominate the patient.*

Hewitt's Fable, showing the degrees or stages in the action of the chief general anesthetics upon the human organism, and the phenomena which usually characterize these stages when no complication, asphyxial or traumatic, is present, makes twelve sub-divisions for the stage of analgesia.[3] Among them is "excessive ideation," "disturbance of judgment, and dreams." At the time the patient is experiencing "excessive ideation and dreams," helpful suggestions are in order. There is a period under an anesthetic at which many patients, indeed, most patients, will see, feel and experience the very things suggested as surely as if they were real, and this period is just before consciousness is lost; just at that stage where painless cavity preparation can be made. To illustrate:

October 2d, 1912, I gave a clinic at Crawford's Notch, White Mountains, N. H., before the Northeastern Dental Association.[4] Although I was on the program for "Instruction in Somnoform Analgesia Induction," some one asked if I would anesthetize a patient for tooth extraction, and I consented. The patient proved to be a large, muscular man, a professional chauffeur, and an alcoholic. The tooth to be removed was a lateral incisor, wedged in back of the central and cuspid, resting firmly against these teeth, turned in such manner that the distal surface was visible from the front, the central and cuspid almost closing the space, a deep circular cavity in the lateral at the gum line. It is remarkable with what regularity difficult cases will present themselves at a public clinic and how seldom ideal cases can be shown.

In the case of an alcoholic I usually prefer rapid anesthetization—to get beyond the dream stage, where disturbances are common, as quickly as possible. I had carried this patient past that stage without a struggle or a murmur, and was on the point of beginning such suggestions as I wished for this case, when some one looking on anticipated me and cried out, "Turn on the second speed." The patient instantly threw out his left foot, leaned forward and grabbed the imaginary steering wheel. I followed him with the appliance, holding it firmly over his nose. After anesthetizing him profoundly enough for any surgical operation, I pulled his head back to the head rest, and the tooth was extracted. As soon as the tooth was removed he leaned forward, again grabbed the steering wheel and was evidently urging his car to do its best. Just then he arose to his feet and, with hands uplifted, said, "Wasn't that a h—l of a bump?" opened his eyes and was wide awake. I have never seen a more pleased or appreciative patient. He assured us time and again that there was no pain, but that he was having difficulty with his car. Any other suggestion, just at the time some one commanded him to "Turn on the second speed," would have been as implicitly obeyed.

When entirely convenient I prefer that the rubber dam be adjusted in all cases in which analgesia is to be induced for operations on the teeth, because, other things being equal, a more satisfactory operation can always be performed with rubber dam in place. Analgesia can be more easily controlled and maintained and the operation shortened and less anesthetic is necessary. The rubber dam not only insures shorter and better operations, but more satisfactory and less expensive operations. The mouth prop is not always necessary, but should always be used when a glass saliva ejector is employed.

Nitrous oxid must be diluted with oxygen, and this can be accomplished by means of pure oxygen passing into a mixing chamber from a cylinder, or the oxygen may be derived from admission of air. For prolonged anesthesia I prefer oxygen for nitrous oxid dilution, but for analgesic purposes, very good results can be obtained by an admixture of nitrous oxid and air. Hewitt has shown that anesthesia with nitrous oxid can be induced by air admixture up to 30 per cent.; with 33 1-3 per cent. he failed to induce complete unconsciousness.[5] As just short of losing consciousness is the ideal analgesic stage, and the average person cannot be rendered unconscious with nitrous oxid and 33 1-3 per cent of air, it would seem that 33 1-3 per cent. of air would be the minimum amount of air admixture and that analgesia could be induced by admitting very much larger proportions of air. The amount of analgesia necessary depends entirely upon the nature of the operation, and there are many cases of psychic analgesia—I mean by this where we seek to disillusion the brain, as much as 80 or 90 per cent. of air admixture may be employed with nitrous oxid. Although air can be used as a diluent for nitrous oxid, in analgesia cases a smoother and more pleasant analgesia can be maintained by the admixture of some oxygen along with the air.

With somnoform air dilution only is necessary; we find that the amount of oxygen contained in the air admitted is all that is necessary. At no time is it necessary to exclude all air in somnoform analgesia induction. With rubber dam adjusted, analgesia can be induced with somnoform with an admixture of 95 to 96 per cent. of air, and an analgesia lasting sixty minutes has been induced with only 12 per cent. of somnoform, in which the most sensitive of cavities have been prepared without the least pain, discomfort or loss of consciousness.

No deaths or serious accidents have ever been reported from the administration of nitrous oxid or somnoform for analgesia induction. With so simple a means at our command, by the use of which we can perform dental operations comfortably, and know to a certainty that they are dependable and will prove more satisfactory and lasting than operations performed without the use of an analgesic, is it not our duty, and will we not better serve our patients by employing analgesics in our daily routine work?

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## DISCUSSION.

**Dr. R. R. Gillis**, Hammond: The Indiana State Dental Society is surely to be congratulated for having this excellent paper from the pen of Dr. DeFord.

Our committees could have chosen no more interesting subject, nor one of more importance at this time; and certainly could have invited no greater authority on the subject of "Anesthetics and Analgesia" than the essayist whose paper I have the honor to discuss.

Dr. DeFord, through his book on Anesthetics, has erected a monument; a monument which, in the future, will be looked upon as one that marks the advent of a method that opens to our profession fields of usefulness so great that only a few can now appreciate the benefits that are bound to come in the near future, benefits both to our profession and to the public. A testimony of the recognized worth of Dr. DeFord's text-book is evidenced by the eagerness with which it has been accepted. When others have asked me where they might be able to find literature upon the subject under discussion tonight, I have been pleased that we have such a reliable volume for reference.

Dr. DeFord, in his presentation this evening, has covered the subject most thoroughly. Nothing is left to offer but a hearty second to the sentiments already expressed.

In a brief paper or talk it is absolutely impossible to give the detail of technic for either anesthesia or analgesia; and that phase is more properly deferred to the operative clinic. It has recently been my pleasure to give a number of clinics and talks upon the subject, and I find that men of the profession are much more interested in the clinics than in the talk. (Reason obvious, I suppose.)

An hour or two might be spent in considering the various details of technic and, at the end of that time, those of you who have had no experience with analgesia would know just as little of its practical side as you would of making a vulcanite plate, if your professor in college had approached your Freshman class and gone through the full prosthetic technic for his first lecture before the class of budding dentists. The making of a plate would appear a fearfully complicated rigmarole, and yet you all know "how easy it is when you know how." And so with anesthesia and analgesia, it is easy when you know how; but the story cannot be made clear in a few minutes.

Altogether too many dentists have caught the fever of analgesia (for the method is spreading rapidly like a contagion); bought an apparatus, expecting that it would run itself; tried it a few times and failed through faulty technic. And then they speak as Wisenheimers and condemn the method.

Of course, this audience is made up of men of broader mental gauge, and you would be surprised to know how many there are in our profession who already know just about all that they are capable of learning. Such men are sometimes old men with years of experience to back up their judgment, but not always; altogether too frequently they are young dentists who have scarcely paid the last installments, as yet, upon the outfit with which they set up their business; recent graduates upon whom all the phrenological bumps of Senior egotism have not been reduced by contact with the hard, hard world.

You all are acquainted with such men. They are not peculiar to our profession alone (thank goodness), but are found in every walk of life. As somebody has said, "God must love the fools, else He would not have made so many of them."

When I meet such a dentist, I clinch my fist and then count ten slowly and endeavor to listen charitably to his story. He says analgesia is a failure—not as represented—can't produce promised results—won't work in his town, etc., until I am sometimes amazed that this subject has sufficient merit to recommend itself to our committee as being worthy the time spent in considering it.

He tried it? Yes, oh, yes, several times, and *failed every time.*

I wonder if he quit foil-fillings or cast inlays for the same reason. Maybe so, and that is why he uses so much amalgam and cement. He is possibly like one whom a friend described by saying "he can't put a cement filling in an umbrella handle and make it stick."

But none of us would accept his condemnation of gold foil or casting methods without a challenge because we know from personal experience that his charges are ungrounded. For the same reason, let me warn you—beware the man who condemns analgesia. He does not know what he is talking about and his argument, consequently, has no weight.

A sufficiently great number of men are getting satisfactory results from the method to convince me that it is all that is claimed for it; and my own experience with it makes me firmly convinced that I am safe to prophesy that, a few years hence, our profession will pay greater homage to the men who have developed and given analgesia to dentistry than to those who have made the gold casting method what it is today (not considering the odium created by subsequent events of recent history).

I am tempted to repeat what was said last year in my discussion of the subject, but time prevents.

Anyhow, it's *GREAT;* "the water is fine, boys; come on in."

A great many hesitate to introduce analgesia and anesthesia into their practices because of the past history of nitrous oxid. Permit me to say that neither Dr. DeFord's paper nor this discussion has anything to say in defense of nitrous oxid alone; we are talking about quite different agents—"somnoform" and "nitrous oxid and oxygen." The first man to get up here in the further discussion that may follow and picture to your imagination some interesting (?) incident from his experience with "gas," beware! I have a brick under my chair and I will throw it at him.

I would treat this audience, in this discussion, as I would a patient in the chair, approaching their first experience with analgesia. If scare-crow tactics and jingo-talk is used, of course the patient (this patient audience) becomes scared, mentally distressed, and failure follows.

But, if on the other hand, we use proper tactics, presenting the favorable side and refusing to consider the arguments that have no bearing on the subject, our proposition will be accepted.

Dr. DeFord very properly spoke of the importance of suggestion in analgesia. That is the fundamental purpose which I would exemply and enforce here.

I wish I had the time to picture fully the comfort of the patient having a tooth prepared for a crown under analgesia; or another sitting quietly while you prepare a sensitive cervical cavity for a filling; or still another expressing his gratitude when a pulp, that has been giving him—fits, has been removed while he slept.

I wish I could efface from your minds the fears you entertain of analgesia till your minds were as free from fear as analgesia is free from danger. *There is no danger*—absolutely *no danger*—in analgesia, and even in anesthesia; with these agents the element of danger is so remote that it appeals to me only as increased responsibility and not danger.

In analgesia your patient can see you, knows every act of yours, can hear you and respond to your instructions and suggestion and is not in any danger whatsoever.

But until you feel that this is true, do not tackle analgesia or you will probably fail. Your patient must have confidence in you and you must have confidence in your method; your patient, your method and yourself constitute a trinity that is bound together by the strong bands of confidence. If the band is weak or lacking between any two, your trinity is ineffective and inoperative.

I have besought a number of my friends to adopt the method for I am an enthusiastic believer in it myself; and I now beseech all of you, who are looking for something that will better your own condition, benefit your patient, and boom our profession, I beseech you adopt the analgesia method.

Get an apparatus; then go slowly for a while. Do not make the mistake of which mention was made earlier in this discussion. Pick out some easy cases for your first ones—some cavities, say, that would not be serious ones under ordinary methods. ''Make haste slowly,'' and as you develop experience, your technic improves, enabling you to progress to more and more difficult cases until, finally, you come to know just what your apparatus will do for you, your confidence is established and your skill developed so that you will not hesitate to tackle anything in general practice.

For your first patients I would suggest that you choose some children from 9 to 15 years of age. They are old enough to understand your motive in trying to do painless work; old enough to appreciate work that does not hurt; not so old but that they are still in childhood's imaginative stages and, consequently, good subjects for your suggestion; and what is still more, of an age that you can approach on some common ground that appeals to their comradeship; be a fellow with them, thus establishing that necessary bond of confidence.

When you can succeed with the young folks, next try the men; and when the men can be handled, you may consider yourself competent to attempt to handle the women. You all know the women are most difficult to manage. Take a tip from me and gain a fair degree of experience before you try to bridle one.

Some fine morning you will wake up to find that you know how to be a ''painless dentist'' because the people have found it out first. You know the rest. The *people* will not fear your chair and burs and forceps.

*When you have eliminated fear the battle is won.*

Fear alone is the thing that keeps people from our offices. Some claim it is lack of dental education, ignorance of the importance of the teeth to good health, etc. They who so contend are wrong; and I need give you no further proof in defense of my statement than to cite you to almost every patient on the occasion of his first visit to your office. They say, ''I am ashamed of myself, Doctor, to think I have put this off so long,'' and so on with a story that we hear every day. They knew better, but were *afraid* to come.

So I say, it is not ignorance that keeps people away. However, I do not mean to belittle the efforts of our oral hygiene enthusiasts; their purposes are worthy and the lessons they teach the laity are sadly needed. But the oral hygiene movement does not allay the bugbear, Fear—it only serves as a whip and drives people to us in self-protection.

And people are not kept away by lack of money—that is, the class whom we all desire for our clientele. They have money to pay for your services and part with it ungrudgingly when you have eliminated suffering in the process of serving their dental needs.

This grows too long. I don't know when to quit, but will close with saying, ''you are missing an opportunity for great betterment when you do not use *analgesia.*''

Dr. Coffield: I believe by the use of nitrous oxid we can generally successfully perform almost all operations that we, as dentists, are called upon to do, with little or no pain.

As Dr. DeFord says: ''The public demands its use and they are willing to pay a good fee.'' It dignifies the profession and elevates your standing. Your patients have the right to expect and it is your duty to them to use the most modern methods, thus enabling you to deliver to them the very best services possible. This you do not do if you subject them to unnecessary pain or pain that can be prevented.

So every dentist should equip himself with the very best means of pain prevention. But, gentlemen, bear in mind, in the use of nitrous oxid and somnoform—I speak of these, for I think the dentist has absolutely no cause to use any other—in the use of these two anesthetics for analgesia and anesthesia, you must not expect in every case to accomplish perfect results. Anesthetics, like all other good things, have their contradictions and failures.

We often have patients with whom we cannot get the results we desire. I do not mean serious effects, but unsatisfactory results.

These cases are so rare that we should not permit patients who will take the anesthetic well to suffer pain without its use.

For our analgesic work with nitrous oxid, it has been my experience that air makes a more suitable mixture than oxygen. By using air, we reduce complications of administration. Air prevents the patient from passing into the stage of abnormal consciousness or into anesthesia, while the effects are just as good as you can possibly get from oxygen.

With surgical anesthesia we have quite another condition. Here all air must be excluded and oxygen used as a diluent. Do not wait too long before starting to give the patient a small per cent. of oxygen. A little oxygen will not prevent anesthesia, but often keeps the system in a better condition to become anesthetized and makes our anesthetic safe. Give your anesthetic until the operation is completed, then remove the inhaler and let your patient be awakened by just fresh air from a well ventilated room which you must always have.

I cannot understand why any one wants to use somnoform when we have so much better anesthetic in nitrous oxygen. The fact that it is so near an ethyl chlorid anesthetic should be sufficient cause to discontinue its use, to say nothing about the nausea which more often occurs after its use.

I fully realize how wonderful it is, the number of times it has been used with no serious after-effects, and that it is easy to administer, yet there will be a number of dentists at this meeting who have administered chloroform in their offices whenever an anesthetic was required, and they have had good results, no serious after-effects, yet we all know chloroform is not a good office anesthetic.

Do not misunderstand me, for somnoform is a good anesthetic, but it is inferior to nitrous oxid, and why should we not always use the best?

Dr. C. C. Miller, Indianapolis: I have read and heard Dr DeFord's paper with a great deal of pleasure and, I am sure, with profit. I am very much interested in analgesia, as I have always been in anesthesia, both local and general. I have worked with most all of the narcotic drugs at our disposal and have noted the virtues and disadvantages of each. The subject is one which interests me deeply.

The essayist being one of the pioneers in the development of a usable dental analgesia, I am glad to recognize him as an authority on the technic of its application. However, I am led to believe that he is, like most men who specialize in any work, a bit over-enthusiastic in his advocacy of analgesia in dental work.

When he suggests that "the average practicing dentist obtains inferior results, knowing at the time that the operation falls short of what it should be, and will fail in a few months because he cannot remove the carious tissue thoroughly or cannot prepare a cavity sufficiently well for the retention of a filling or inlay, and fails utterly in shaping properly a tooth for a crown because it becomes too sensitive," I believe he does the dental profession a great injustice. I do not believe that the average dentist stops short of what he believes to be a correct cavity preparation on account of pain, except in a small per cent. of cases.

I will confess that many dentists fail to do the best they know in the matter of shaping teeth for crowns. But I am convinced that the reason for this is not so much the inability of the patient to bear the pain necessary for a correct tooth preparation as that the average dentist does his crown work at a fee which will not justify what he knows to be a correct preparation.

I gladly agree with the essayist that to allay the pain induced by the dental surgeon in routine work is highly beneficial to the patient, and I believe that among the more discriminating patients there will be an ever-increasing demand for real painless dentistry at its increased fee. But even though this be true, we must bear in mind that the average dentist spends but a small part of his time with patients who want and are able and willing to pay for scientific painless service.

Dr. DeFord says that today surgeons are performing operations in towns of 1,000 inhabitants—something unknown fifty years ago—and he gives the credit to the anesthetic agent at the surgeons' command; and he goes on to say "when dental surgeons generally avail themselves of the kind offices of analgesia and anesthesia in routine work, in a few years we will look back on the class of dentistry now being done, and it will appear as unsatisfactory as the surgery at the time of the introduction of general anesthesia by the medical profession."

I can see no reason to agree with this idea. We all know that within the last fifty years medicine and surgery have made no greater advancement than has dentistry. And while we will no doubt continue in quest of scientific knowledge, the same results would obtain with or without analgesia. As the essayist says, surgical analgesia varies in different individuals; with some it is present at the very beginning of the analgesic stage, while with others it is absent till we approach or reach the beginning of the light anesthetic stage. And from my own experience I am sure that it is not an easy task at all times to hold the patient within that narrow margin which separates sensibility from narcosis.

I would call your attention to the fact that all who are skilled in the use of anesthetic agents, either consciously or unconsciously, give due attention to the mental attitude of their patients; in other words, they combine suggestive therapeutics with the narcotic drug.

Dr. DeFord speaks of the susceptibility of patients to suggestion during the stages of analgesia. And Dr. Clark says that he uses 50% nitrous oxide, 50% oxygen and 50% suggestion. We know that to successfully administer suggestive therapeutics, with or without an anesthetic agent, there must be established a proper harmonious mental relation between the dentist and his patient. With an antagonistic relationship existing, suggestion counts for nothing. And I believe that the more thoroughly we are able to establish this much desired mental attitude the less need we have for analgesia, and just as we fail to gain the full confidence of the patient and to establish mental and nervous relaxation, the less satisfactory will be the analgesia.

The more I work with anesthetic and narcotic agents the more I realize that there is an element of danger in the use of all, unless a great degree of intelligence accompanies their use, and the more I want to be able to give all of my time and attention to the condition of the patient under the influence of such drug, and not divide my mental forces between the anesthetic and the operation at hand. And for this reason I believe that I am able, with my limited knowledge of analgesia, to make a better cavity preparation without the responsibility of the oversight of an analgesia.

Dr. Gillis has agreed with Dr. DeFord so thoroughly that I have no comment to make on his discussion.

Dr. DeFord recommends oxygen for $N_2O$ while Dr. Coffield finds air to be the better diluting element. I mention this only to show you that our experiences vary largely in handling these agents.

Having criticised Dr. DeFord's paper at every possible point, I wish to say in conclusion that it is not my purpose to decry analgesia or to discourage its use. For I am satisfied that its virtues will make for it a permanent place in dentistry, and that we who expect to gain and hold the patronage of the discriminating class of patients may as well "see the hand writing on the wall" and avail ourselves of the kind offices of analgesia. And for the operator who has at his disposal one skilled in the use of analgesia so that he can operate with the mental freedom of a modern surgeon, analgesia is certainly an ideal method.

**Dr. Arthur Gudell, M. D.**, Indianapolis: It is interesting to watch the evolution of every new thing in dentistry. Taking example from our brethren of the medical profession, we need to admonish ourselves to be careful of adopting unquestioningly every latest suggestion, however plausible the appearance and promise of it. Thus our medical brethren went wild for a time over Ehrlich's introduction of a syphilis remedy familiar to you all, No. 606, which was vaunted as a certain cure, one injection only being required. The quacks went wild over it, announcing that it was to rid the world of the worst of diseases. But the remedy has fallen far short of its initial reputation. One administration will not do anything like what was claimed for it. Nevertheless, it remains the best remedy thus far, for that disease, though dangerous in unskilled hands.

Now, as to analgesia: We find three types of men to consider as exponents of the process and administration. First, there is the idealist, who does much good and some harm; then we have the scoffer, who does much harm and some good; finally we have the student, who works methods out from theory, using a scientific basis of observation.

The neophyte. who sanguinely expects to be as successful as others who have had long experience in the use of this method of pain-allaying, is liable to have his confidence shaken. Then when, through ignorance of the science of using the agent, he fails, he joins the ranks of the scoffers. His experience, his adverse opinion, pass for less than they might, as concerns others coming forward to inquire as to the merit of the remedy, than they would had he had, first of all, knowledge and insight to direct him aright.

I am sorry Dr. Sexton is not here tonight. I should like to hear him discuss this topic.

As it was with salvarsan, so it is likely for time to come to be with new remedies; they will come on a tidal wave; they will recede and be lost to view, after the same manner.

I do not believe there is any danger in employing analgesia. If dentists report failure, I say it is due to selecting unfavorable subjects, or to their own misconception of how the gas should be administered. They need first of all to learn to go slowly. The man who tries to run an automobile, and proceeds to back away from a precipice by placing his lever at full speed forward, is inviting disaster.

One thing I wish particularly to mention; that is, suggestion. That is the foothold of all the scoffers. If they can get 50 per cent. suggestion and the rest analgesia, they are satisfied; they say the suggestion did the work.

We should know the nature of these agents we propose to use. Nitrous oxid and somnoform are depressants of the central nervous system. Like alcohōl, they are progressive depressants. They attack one set of nerve centers, and then another set, and so on down the line. So with any anesthetic· the volitional centers are depressed first. The first inhalation of nitrous oxid will give a sense of exhilaration. This is rapidly followed by the narcotic and anodyne stage, in anesthesia. But in analgesia we have the mind of the patient depressed, the stage of intoxication being less pronounced, and then we have the phenomenon of the weaker mind being influenced by the stronger mind of the operator; the patient is non-resistant to the suggestions of the operator—in other words, the operator prevails over him by suggestion, because of his greater susceptibility to suggestion, under the analgesic influence.

I appreciate Dr. DeFord's paper and value his suggestions, because I know him to be a man who studies his subjects thoroughly before coming before a convention with a paper.

**Dr. A. D. Black**, Chicago: I do not want to let the occasion pass without at least expressing briefly my appreciation of the worth of this interesting paper. If I were disposed to discuss the paper, I should be inclined to suggest the advisability of selecting cases with extreme care. I do not believe this method is applicable to as many cases as some apparently think; it is surely a question which is open to discussion and it will be well for each man to consider both sides carefully. The oft-repeated suggestion that we should practice analgesia because there is money in it, is a reflection on professional men. While we should be interested in obtaining a considerable income, we have not the right to adopt this, or any other method, to that end unless we consider primarily the benefit to be derived by our patients. There are certainly many cases in which we will be able to give the best service without analgesia, and I think there are a few in which the best service will be given with it. I deplore the idea of commercialism which appears to be the basis of many appeals for the adoption of this method as part of our daily practice.

**Dr. DeFord** (closing): One reason why I prefer somnoform is that a greater number of operators can use it to greater advantage than nitrous oxid. Another reason is, you get a more pleasant effect for your patient. If another can get a better effect with nitrous oxid, I am sure I have no occasion to quarrel with him on that account. It is the duty of every operator to render his operations as painless as possible by the intelligent choice and use of the anesthetic most successful in his practice. I believe we can do better dentistry for a patient who has not been rendered so nervous that he cannot sit still, by some agent employed for analgesia.

The fact that a dentist has not succeeded with one agent or with one method, is not necessarily a condemnation of that agent or method. Dr. Black, of Chicago, outlined a system of preparation of cavities for filling. Some dentists have not been successful, following his directions. Yet they make good fillings by methods used years and years ago. It does not follow from this that no one can succeed by employing the Black method. It is usually a matter of technic, of perseverance in practice. Some dentists discredit the gold inlay. Why? Because they have not succeeded in making good gold inlays. Down east, especially, they ridicule the gold inlay. But nobody in the west doubts for a moment that dentistry has been advanced a hundred per cent. by its introduction.

Dr. Black has referred to commercialism as an element to be considered. That, of course, is a good objection. It is as unethical to use analgesia merely for the fee as it is to make gold fillings because you can charge more for them than for cement. I need not discuss that.

As to the matter of selecting patients—you will find, after a little experience, that you can control almost any patient by inducing in him an agreeable state of mind. A patient already in a condition of distress and alarm, anticipating something terrible, will quickly detect anything like uncertainty or self-distrust, in you. That is something you will yourself overcome with experience. Do not allow the patient to discover that you are not quite sure of yourself.

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## A Good Appointment

Charles H. Oakman, D.D.S., M.D., has been appointed Associate Clinical Professor in the new million-dollar Detroit College of Medicine and Surgery. Dr. Oakman will lecture on Preventive Medicine and Public Health, as well as do oral surgery clinically before the medical students. This is the first time that oral surgery has been recognized in the medical schools of Michigan, and the college is to be congratulated on its choice.

# BRIDGE WORK*

BY JAMES R. FOREMAN, CLINTON, MICH.

IN ALL THE WIDE SCOPE OF DENTISTRY, there is not a department so greatly abused as the crown and bridge department. While this is literally true, it has also another aspect. Many thousands of persons owe to the insertion of crowns and bridges a portion of their good looks, at least. Aside from the regulation of teeth by the orthodontist, there is nothing that renders such a service from the esthetic standpoint as bridgework.

There are two kinds of bridges—good and bad. They either accomplish their end or they do not. The results attained vary greatly. This is such a broad subject that it is impossible to deal with it in all its phases, and it is my intention to merely outline a few essential points, and trust that the best points will be brought out in the discussion. The foundation, as you all know, is the proper filling and preparation of the root. More bridgework fails from the lack of proper root preparation than from all other causes combined. Root preparation bears the same relation to successful work that cavity preparation does to the successful inlay. It is not my purpose to discuss whether a root should be devitalized or not, but I do wish to say that neither the pulps nor tooth structure should be considered in the insertion of a bridge, and I also wish to say that in extensive work the devitalization of the tooth is absolutely essential to good work.

A word about canal fillings. I think oftentimes the reason for ineffective root fillings is that the canal is not opened up sufficiently before the gutta-percha is inserted. It is merely filled full and then cut out with a reamer in engine, and many times the gutta-percha will catch on the instrument and be partially, if not thoroughly, removed. If a pin is to be used, the canal should be opened large enough to accommodate the pin before the gutta-percha is inserted—then merely the end of the root filled.

If shell crown is used, it can be filled full. Roll your own point size of canal, which you can estimate by plug of cotton. Roll from base plate gutta-percha with warm spatula on glass slab. One is better than several. Given proper root canal filling, the next step is cutting down the root; and right here is the step which decides the future of your work. Don't be afraid to cut, for you can restore. A good rule, especially on anterior teeth, is to remove all the enamel. This work is greatly facilitated by the use of enamel scalers Nos. 7 and 8. Ordinary enamel cleavers are too heavy to go under the gum where trimming is necessary. Remove the enamel. If it were possible to slip off enamel shell of anteriors, the root would be prepared. It is different in molars and bicuspids. Now that we have the root properly prepared, which ought to consume time anywhere from one to two hours—for molars—we can take up the attachments. For the molars there are two kinds of crowns indicated for bridge attachments: the cast and the much-despised two-piece crown. The seamless crown is ideal for individual crowns, but not for bridgework, for the reason that the metal generally used is too soft, and when swaged, is too thin, and in swaging it becomes impregnated with base metal and is weakened. When the piece is soldered, it is likely to tear out where low grade of solder is used, because it is superficially alloyed, and at the point where the solder ceases to flow we have a thin alloy of metal and hence a weak place. Fortunately this does not happen often, but it does sometimes happen, nevertheless.

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*Read before the Michigan State Dental Society, 1913.

I shall now describe what I consider the ideal attachment for molars—the cast crowns. You are no doubt familiar with the method of constructing the crown. The great feature of this crown is the ease with which you can fit it to the gum margin. A seamless crown has to be fitted at the gum all over again after being finished, while you have already fitted the copper band, hence you have two fittings, where one would suffice, and at your final and most important fitting, you are unable to see in the top of the band, and often a poor fit results, when the copper band may have been fitted perfectly. The measurement is taken with the wire in the usual way; lay on 30 g. gold and cut quite a little inside the mark, then sweat. When you attempt to fit the band it will be too small (just what you want). With Peeso stretching pliers you can gradually adapt to root, and in adapting you are thinning your metal at the same time, which is an added feature to the crown, for a thickness of metal at the gum is undesirable. The band should be sweated because you have a stronger union than with solder, and you have no joint to open up in final soldering, and incidentally it is quite a saving in high grade solder generally used. The band can be contoured, waxed and cast, and when finished you are sure it will go well to place without an extra fitting, and above all, you know it fits.

Now for the anterior attachments. Their name is legion, but I shall attempt to defend one that occupies not a very high place in some practices, namely, the Richmond crown. The principal objection seems to be the band, and for that reason many have ceased to use it and have resorted to the cast crown, plate and dowel crown, etc. A properly inserted Richmond crown is, to my idea, the ideal for all bridge attachments where anterior teeth are involved. The reason it has fallen into disfavor is because it has been abused. The search for the reason for its failure takes us no further than the beginning of this paper. The old bugbear, root preparation, bobs up here stronger than ever. If the root is properly prepared, all the enamel removed, the band can be fitted so as to cause little or no irritation at the gum margin. Use the same method as in the molar band, thin out the metal and don't try to make a band too wide—really the narrower the better, and at times a half band can be used to good advantage. One place where a Richmond crown is indicated is on the laterals. It is not wise to use the laterals for abutments for bridges, but at times it is necessary to do so. For a long bridge, the lateral had better be sacrificed. I might say right here that even in the individual crowns the lateral must be handled carefully. Many split roots result from ready-made crowns in the laterals, and in these individual cases the Richmond crown, with its narrow sustaining band, is the ideal restoration. Less trouble will result than from the great big pins of the ''hand-me-down'' crowns.

I shall not go into the assembling and soldering. You are all familiar with that procedure; but next to the abutments in importance is the occlusion. A good friend of mine stated in a meeting one time that it would be best to throw your die plate into the well, as it was absolutely worthless for making dummies. The cast method may be ideal, but I hold that it matters not how you get the occlusion, so that you get it.

The die plates on the market, many of them, are poor affairs, but with the cut-out cusps I have here the occlusion can be secured accurately. They can be imbedded in the wax and adjusted; then pure gold swaged over them, filled with gold coin, and it is equal to the case method, and much quicker. Many of those men who condemn the die plate are using interchangeable teeth for bridgework, and I think it is as easy to secure occlusion with the die as with the ready-made teeth. The bite is very essential. I make use of the Peeso articulating plate, taking the impression and the bite at the same time with plaster. I will be glad to show any of these methods if you care to see them.

### DISCUSSION

Dr. C. P. Wood, Detroit: No one could listen to this paper without realizing that the essayist understands his subject. I wish to call your attention to the great importance of removing any and all deposits and atrophied membrane from the roots to be crowned or bridged, otherwise we cannot expect the best results, however good and perfect our mechanical work may be.

The all-important thing in fitting bands is to first shape the root so that the largest part is just where we want our band to stop. Then see that it stops there and fits tight, and we will have very little or the minimum irritation of the gums from it.

For some years I have occasionally noted a bridge or crown made of platinum or iridio-platinum bands. In none of these cases have I failed to recognize that there was very little soft deposits, or placques, adhering to these bands, and in consequence, the gum tissue and peridental membrane kept healthy and in much better condition than when gold is used. As a result I have been advocating iridio-platinum band in place of gold. We can use it much thinner and get better adaptation, and I believe the appearance as good as gold bands.

Dr. J. L. Sweetnam, Manistee, Mich.: I hardly want to lose so good an opportunity of saying something on this subject of fixed bridge work. I want to protest against fixed bridgework right from the foundation up. After doing bridge work for about twenty-five years I quit putting in bridges, for the reason that teeth can be restored in a better and more sanitary way. In these days we have so many good attachments for removable saddles, there is no excuse for resorting to such unsanitary methods as fixed bridges necessitate. The day has come when we dentists must regard sepsis due to gilded dentistry in the shape of fixed bridges, gold shell crowns—"American Beauties," "Tomato Cans," or by whatever name you wish to call them. I will remove any gold shell crown that comes into my office, even if it had been inserted only the day before, and do honestly believe I have done my patient the best possible dental service by removing all such "American Beauties." There is not one fixed bridge in ten that has been in the mouth for ten years that would not be positively filthy. I think those of you who have known me and have seen my operations at these meetings for the last twenty-five years, know that my work has been very close to the line. Still I have been disgusted with my own work up to the time I discontinued inserting fixed bridges. You all know what their condition is after they are in use a while. Let us get rid of this gilded dentistry. The doctor has taken pains in getting up his paper, and given very good advice on the filling of the roots. He opens up the roots where he can get at them and know what he is doing, which is as it should be.

Of course, we have to have abutments with the removable work, but those roots and broken-down teeth can be made so clean and sanitary and protected so thoroughly that they will remain in a sanitary condition for a life time, and saddles may be removed at will for the purpose of cleansing, and so far as the appearance is concerned, it is far superior. I want to register a protest against gold crowns and fixed bridges. They are a curse to dentistry. We see it every day. I would not put a gold crown on a tooth under any circumstances. If a patient comes into my office with a gold crown I take it off. The point I want to bring out and emphasize is our duty to get conversant with the newer methods of restoring lost teeth.

Dr. E. J. Chamberlain, Grand Rapids: This paper shows a great deal of study and I don't know that there is anything that I can add to it. I am not from Dr. Peeso's school, and there are one or two places in which I differ with Dr. Foreman. Root canal filling is one of them. I wouldn't attempt to open up a root canal with a reamer and then attempt to fill the root canal to the apex, for two reasons: one, I would be afraid of infection; and the other, I would be afraid that with this one large root canal point, I would get too much pressure through this large opening, causing inflammation at apex of root. The idea of making a gutta-percha point from a pattern from cotton taken from the root, I think would be a very difficult proposition, although Dr. Foreman will be glad to show us this method.

He says that he despises two-piece crowns. Personally, I have more success with a two-piece crown than any other, by first fitting my band.

Dr. A. C. Thompson, Port Huron: Let me inject one expression into this discussion, and that is, that the proper restoration of interdental spaces will do much to make fixed bridgework a success. I am not in favor of the disuse of fixed bridgework as some have advocated, but rather seek to correct the evils that have existed and are evident in so many fixed bridges today, and one of these is the loss of the interdental spaces.

Dr. Tashjain, Kalamazoo: The question of a fixed or a removable bridge isn't of very much importance just now. But if we think fixed bridges to be most useful to the patient, then there are some problems which confront us, viz.: problems of root adaptation and problems of cleanliness. In the problem of roots and crowns with fixed bridges, no matter how well the roots are prepared, when you join those two roots together—you create a new problem to the dentist. You can't parallel two roots in the mouth so when you solder the parts the two abutment crowns will go together in the same position on the necks of roots as they did before the crowns were joined. For that reason I believe that the future bridgework, if it is going to be a fixed bridge, is going to have two sets of bands, an inner band and an outer band with a crown on it, so that if the parts show slight tendency to bad adaptation of the abutments the inner bands will have taken care of that trouble and saved the root both from decay and irritation of gums.

Now, the second question of fixed bridge work is a question of personal hygiene. Each dentist should see that the patient is able to clean that bridge and its surroundings. If he does not do that, he is simply throwing away his mechanical skill into the careless hands of the patient, who is probably innocent, and that is the reason the physicians are condemning the dentists. The physicians do not know the cause of these troubles; they simply see the results of neglect. But the neglect may be due to the lax habits of the patient himself. Even plates come to us in a filthy condition, and if these are not kept clean, the responsibility of educating the patient with a fixed appliance in the mouth rests doubly heavy on us.

Dr. ———————: Bridgework is the most important subject in our line of work, as it takes in the treatment of teeth and proper occlusion and considerations that we have to allow in the different cases that come in our line of work.

I maintain that we should not be too impartial in any part of work, but we should widen our scope of all different forms of work that can be done in bridgework.

Dr. Sweetnam said that he did not think a fixed bridge practicable. I have two fixed bridges in my mouth, and they have been there for seven years, and they are still satisfactory. We find that there are so many different opinions that it is hard to decide which method to use.

We all have our own ideas, and I appreciate what I have heard on the subject and I hope that I have said nothing to promote conscientiousness along the different lines of work.

Dr. R. C. Simmons, Detroit: I did not expect to be called on for discussion of this paper, but I felt that there were some things that I would like to speak about, and I am glad the chairman asked me to say a few words on this subject.

I want to thank Dr. Foreman for his paper, and it only shows how conscientious some of the younger men are trying to be in furthering the cause of dentistry, in trying to promote the standard of thoroughness in their work, and it personally makes me feel gratified to hear Dr. Foreman give this paper, knowing that he is one of the younger men in the profession.

As far as the root-canal filling is concerned, no doubt there could be considerable discussion in the way of Dr. Foreman's preparation of roots for the pin. I think that is a personal equation of the dentist. We all have our own individual methods in accomplishing what seems to be the same end, and that is carefully sealing the apical foramen, through which no infection can come, and which will preserve the root for after-use.

As far as the two-piece crown is concerned, I think that Dr. Chamberlain misunderstood Dr. Foreman. The cast cusp crown which he mentioned is really a two-piece crown with the cusps cast instead of being swaged and soldered to the band. With this crown you can, in the first place, use a heavier material for the band, and you can get it fitted around the gum line better than where you use a seamless crown, and when the seamless crown is made, you really have to make another fitting around the gum and you can't see whether you have the correct fit or not and, therefore, I heartily agree with his method in the two-piece or cast cusp crown.

For the anterior abutments for bridges I think there is nothing as good as the Richmond crown, but in my use I modify it, and you can better call it a ferruled Richmond. The improvement over the old banded Richmond is that you avoid the overhanging edge of gold, but still have the strength. My method is to make a ferrule for the end of the root which I will show in a clinic this afternoon. I make either a full ferrule or a half ferrule, and in that way you will accomplish what you will accomplish in a full banded crown, and without its many objectionable features. It is very hard to explain by words, but I will explain and will be very glad to show you in a clinic. The great advantage is not to have the overhanging edge of gold.

Dr. Foreman brought out a very good point which many of us have been at fault in, and that is in taking the impression with wax for the bite. First, it is almost impossible to get an impression that will fit the model in such a way as be sure you have proper articulation. For small bridges I use, in taking the bite, what are called the Weiss shields, I think, but am not quite sure of the name. They are composed of two spoon-shaped shields joined together by strong thread. By placing the modeling compound between the shields the impression and bite can be taken at same time, and I find this is a very fine method, and at the same time almost accurate.

I don't think there are any more points that I want to bring out, as time is passing by, but I wish to emphasize this, that so many times, for the sake of hurrying this work, we are inclined to go at it in a haphazard manner.

DR. FOREMAN (closing): I am sorry our friend here has such a bitter dislike for bridgework.

Suppose it were possible at this instant to deprive our patients of every fixed bridge now doing service, what would the result be?

The other objection raised regarding filling the canal is of minor importance. I think it is easier to fill the canal snugly to the apex with a point rolled to suit each individual case. In other words, a point which exactly fits the canal is better than several small ones.

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# USEFUL APPLICATION OF DeTREY'S LOW FUSING PORCELAIN*

BY H. R. CONKLIN, SO. CHARLESTON, OHIO

By this clinic I demonstrate a very quick and accurate method of securing perfect adaptation to the natural root of any manufactured crown.

Select crown and grind approximately. Then build up with DeTrey's porcelain (mixed with pure rainwater) the parts of crown not in contact with root. Apply to root and press to place. The porcelain will adhere to crown, if you are careful, and do not apply to root when too moist. Repeat this until a perfect adaptation is secured, building out the crown in any direction needed. Form a cone of platinum foil. Insert crown into cone to protect it from direct contact with flame. Be careful that the new porcelain does not come in contact with platinum cone or it will fuse to it. Bake in flame of alcohol blowpipe run at low pressure, or in any clean hot flame. Repeat the operation until shrinkage is overcome. Two bakes will usually suffice for the most irregular roots, and a perfect adaptation to the root is secured in a very short time. I am also showing inlays of the same porcelain made in the usual way with platinum matrix and baked in flame where you can watch your fusing.

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*Clinic at Ohio State Dental Society.

# A NEW ATTACHMENT FOR REMOVABLE BRIDGEWORK*

BY CHARLES F. ASH, D.D.S., NEW YORK, N.Y.

IN DECIDING UPON A TITLE for this paper, I hesitated to use the word "new" as the same general principle was used many years ago, but never, so far as I know, in the form in which it is presented to you today.

It would be impossible, in one afternoon, to consider all the variations of which this attachment is capable. Therefore, I shall describe the making of a single piece, and refer briefly to some of its variations. Assuming for our purpose that the teeth to be supplied are two bicuspids and a molar, the first step will be the preparation of the abutments, which, in this case, will be in the form of a hinge for the molar end, and a lock box for the cuspid.

The second molar and cuspid must first be devitalized, and the roots properly filled. The molar is then prepared by having the sides paralleled and the occlusal surface cut down to make ample room for good solid cusps.

The next step is to make room for the box which shall receive the hinge joint. This is done by cutting away the whole lingual wall of the molar from the occlusal surface down to the gingival margin until approximately one-third of the diameter of the tooth, bucco-lingually, has been removed. This gives us a deep, square step. (Fig. 1.)

A thin platinum shell, about 36-gauge, is then swaged to completely cover the molar and extend below the free margin of the gum. Later on with the box in position on the step, we will cast a contoured gold crown on this platinum shell, but for the present we leave it as it is. I might say right here, however, that *all* the gold crowns used in my practice, are cast this way on a platinum shell after the method developed by Dr. Chayes and described by him in *Items of Interest.* And to those of you who have not tried it, I want to say that if you once use a cast crown on platinum shell, you will find it impossible to go back to the old-fashioned crown.

The cuspid is then cut off, and the pulp canal prepared to receive as heavy a post as the conditions will permit. Then with a large round bur, followed by a large cross-cut fissure bur, or suitable stone, countersink the face of the root for a considerable space around the post-hole. After fitting the post, remove it and swage a piece of platinum to the face of the root and into the the countersunk space; then force the post through the platinum floor and into the root, and tack together with a piece of sticky wax; then remove and solder them together with platinum solder.

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*Read before the Ohio State Dental Society December, 1912.

If care is observed in swaging the platinum so that it absolutely fits down into the oval depression around the pin, you will see how absolutely impossible it will be to set your abutments on the root one hair's breadth out of the way. This makes for accuracy in the setting of your abutments, and accuracy is absolutely essential to the success of the work.

This preparation of root abutment has been followed by me for some years, and its desirability is emphasized in this particular class of work, as the face of the root permits the placing of the facing, the backing and the box, without interference by the post; and when the gold or solder is flowed into the countersunk space and around the post, forms a firm attachment between the foundation and the superstructure.

We now have the framework of both abutments.

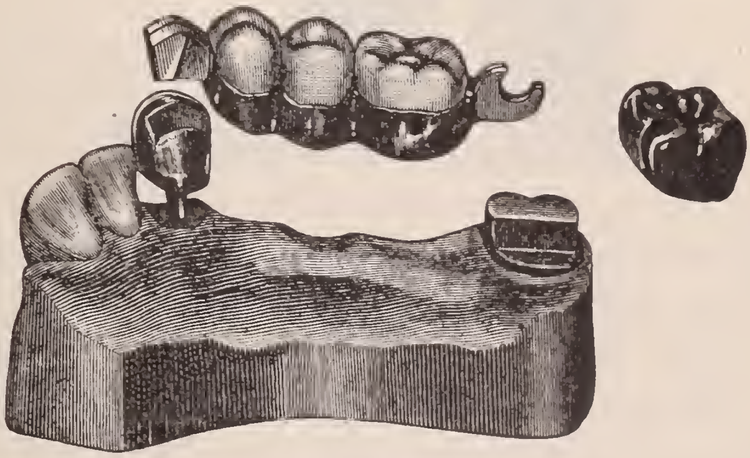

Fig. 1.

By this time the teeth for the case should have been selected, a Steele facing for the cuspid, and Davis or Goslee crowns, for the bicuspids and molar.

The platinum shell is now placed on the molar (and, by the way, it should fit just as well as the skin of an apple), and the platinum floor and post put in position on the cuspid. A bite and impression are then taken, the impression, of course, being taken in plaster

Before the cuspid abutment is placed in the impression, a thin copper tube should be made; the tube to fit over the post, which, when the model is poured, will represent the root canal. This will make possible greater accuracy and easier handling.

The platinum molar shell and platinum cuspid abutment, with copper tube, etc., in position, are now placed in the impression, and we are ready to pour the model.

It is desirable to fill the first half of the impression with some good oxyphosphate cement and finish with plaster, thus providing a model, the working part of which is built of cement. The bite is then poured and both models mounted on an articulator.

The molar crown is now built up in wax on the platinum base, contoured and carved to proper occlusion, and the cuspid facing ground and waxed to place. The two cuspids and the molar porcelain crowns are fitted on the model at this time simply to help us in obtaining the proper contour of the cuspid and the molar abutments. The saddle portion, holding the two bicuspid and molar crowns, is then removed from the model.

The next step is the making of split bars and the boxes to receive them. Let us make the cuspid attachment first.

### TECHNIC FOR CUSPID BOX AND SPLIT BAR.

Remove the Steele facing from its backing and replace it with sticky wax to hold the backing in position. Then remove the wax from the lingual side of the backing. Next, to form the split bar, take two square or oblong pieces of iridio-platinum plate, about 24-gauge, and fit them to the floor of the cuspid abutment, and as close as feasible to the backing of the Steele facing, and shape the occlusal edges to conform approximately to the finished contour of the lingual side of the cuspid. Then a V-shaped piece of iridio-platinum, of about 28-gauge, is soldered with platinum solder to the lingual surface of the split bar. (Fig. 2.) The apex of the V must be towards the floor of the cuspid, the base of the V being about two-thirds as broad as the total space occupied by the split bar on the abutment mesio-distally.

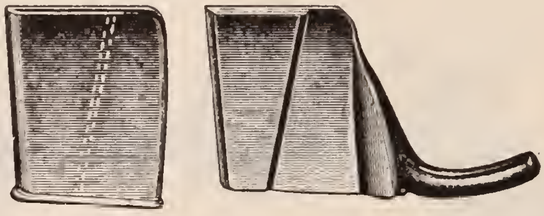

Fig. 2.

In order that the mesio-gingival corner of the split bar may have proper clearance in putting in and taking out the removable portion of the bridge, and also that the split bar may properly fill the box, the mesial end of the split bar must now be tapered occluso-gingivally. (Fig. 2.) The distal ends of the bars are then bent away from each other to form a V-shaped space, into which is fitted and soldered with platinum solder an iridio-platinum pin or tail-piece (Figs. 2 and 3), which is later on united with the removable saddle by casting. A box of 30-gauge platinum is then made to accurately fit the split bar thus formed.

### MOLAR ABUTMENT.

The wax on the lingual third of the molar is removed, and a plain split bar made, with the mesial ends bent away from each other, thereby forming a V-shaped space into which a tail-piece of iridio-platinum wire is soldered with platinum solder, which tail-piece is later on united with the removable saddle by casting. A platinum box is made to fit this split bar, and the occlusal edges of both box and split bar fitted to the bite as in Fig. 4. The platinum boxes are now waxed in place on their respective abutments, and while their horizontal planes may differ, care must be taken that both boxes have the same vertical plane. The wax of both abutments is then carved to proper contour, and the sticky wax on the labial side of the cuspid backing being, of course, removed, the abutments are then invested and cast.

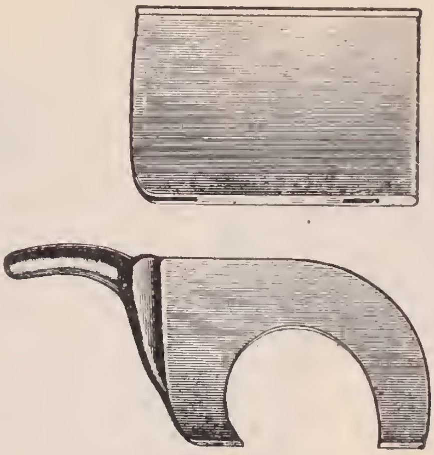
Fig. 3.

The split bar for the molar attachment is then formed in the shape of a hook or sliding hinge (Figs. 3 and 5, the latter being a sectional view), a general description of which is as follows: (See diagram.)

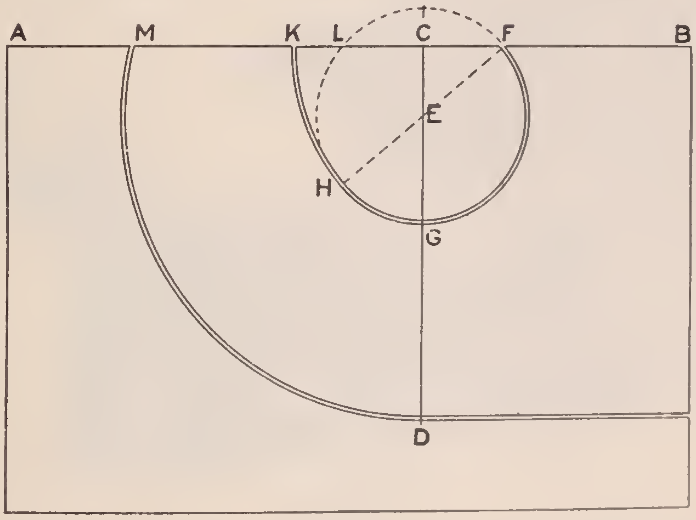

Diagram.

At a point sufficiently below the deepest indentation of the bite to allow for proper thickness in the bite contact, draw a line A B across the occlusal edge of the split bar and parallel with its gingival edge. Then at a point C, midway between the distal end of the split bar and the point at which the split bar protrudes from the box, draw a line C D, perpendicular to A M, from A B to the gingival edge of the split bar. Let E be a point one-fifth the distance from C to D, and G a point so that C G equals G D. With E as a center and a radius of E G, draw a circle intersecting A B at F and L, and with the same center and radius E D, draw the segment of a circle D M, intersecting A B at M. Draw the diameter F E H, and with F as a center and radius F H, draw the segment of a circle H K, then F K will be equal to F H. Then cut along the lines M D and K H G F.

The cuspid and molar abutments are now placed on the model and the split bar attachments in their respective positions in cuspid and molar. (Fig. 4.)

The waxed-up removable saddle is then replaced in position on the model and the tail-pieces of the split bars are securely incorporated with the wax of the saddle. The saddle and split bar attachments being firmly waxed together, it is desirable at this point to approximately trim the mesial end of the wax saddle to allow for clearance for the finished piece to be put in and taken out.

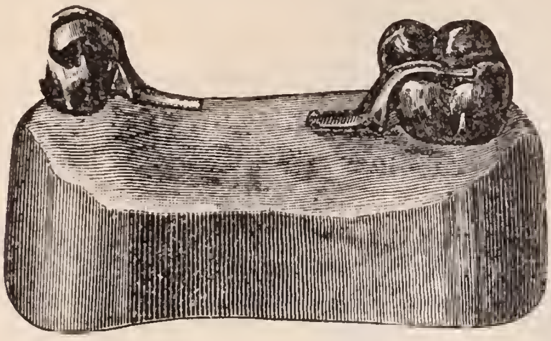
Fig. 4.

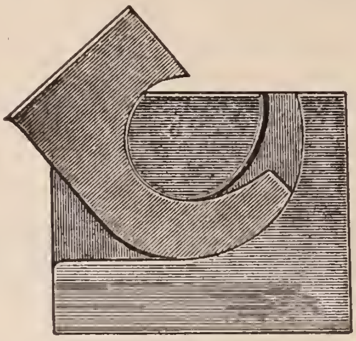
Fig. 5.

The saddle and split bars are then removed from the model and the saddle cast, uniting with the tail-pieces of the split bars, the porcelain crowns, of course, being first removed from the saddle.

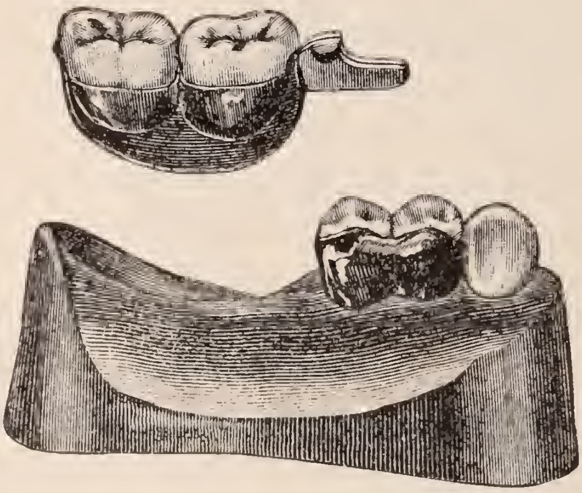
Fig. 6.

We now have our piece practically completed except for the closing in of the box at the molar end, and making the final adjustment for the clearance, but these last touches require more care and nicety of handling than perhaps any other part of the work.

The molar box has been left open up to this point to allow for some slight contraction in casting the saddle. A strip of thin platinum of the same width as the box is now burnished over the hinge of the molar split bar, and the saddle and split bars with the thin burnished strip in place, are put in position on the model, and the platinum strip waxed to place in the molar box.

That part of the molar box, which was occupied by the split bar, is

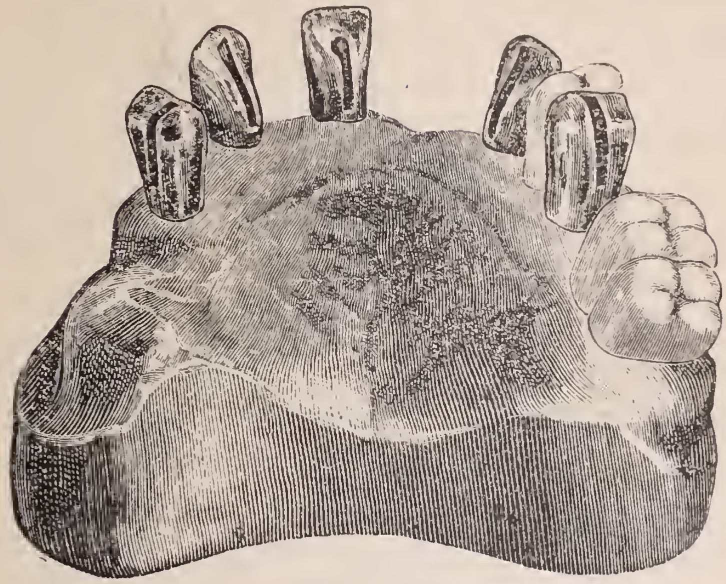
Fig. 7.

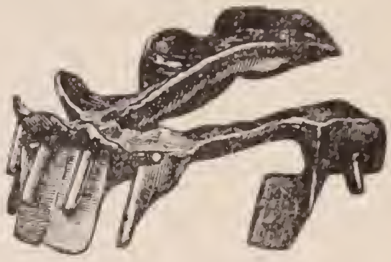
Fig. 8.

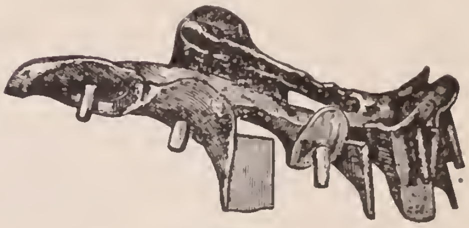
Fig. 9.

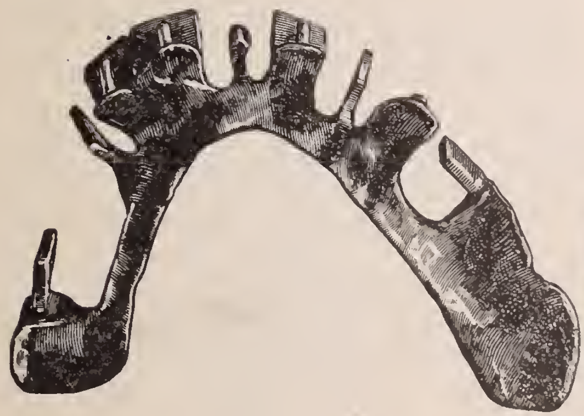
Fig. 10.

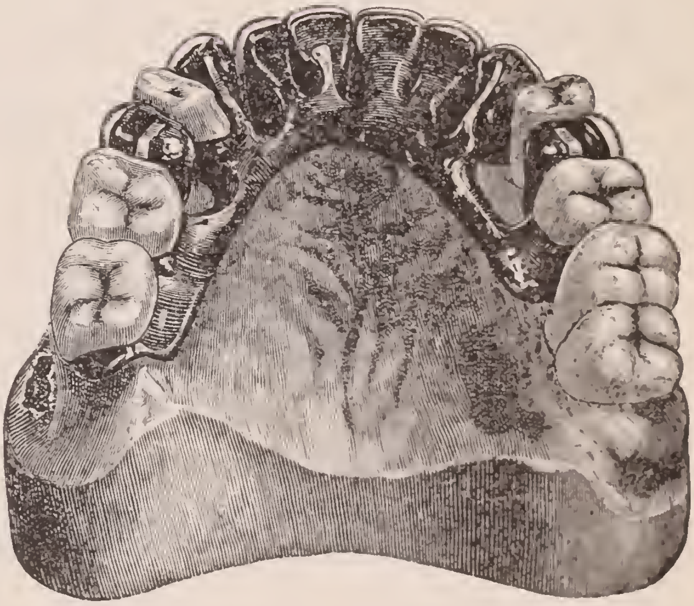
Fig. 11.

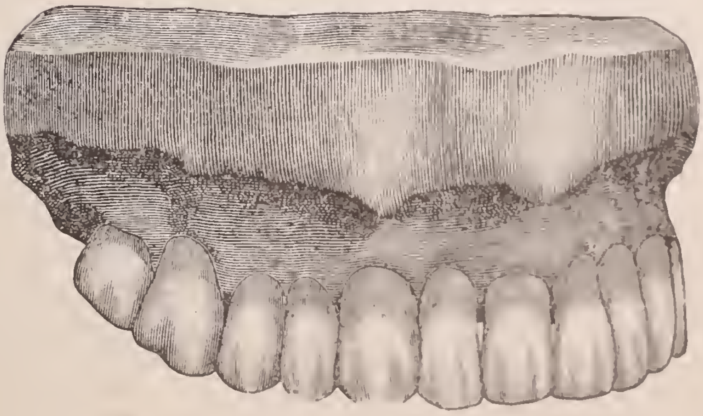
Fig. 12.

then carefully filled with asbestos and the wax burned and replaced with solder to contour to occlusion.

The parts are then assembled on the model and the clearance for the mesial end of the saddle to pass the cuspid is then finished. The occlusal edge of the cuspid split bar is finished flush to contour with the lingual side of the cuspid.

After having made a few cases it was found desirable to have the distal end of the hinged joint protrude through the top of the box and form part of the contour of the crown. This gives us an opening at the distal end, which makes it possible to easily clean the box.

The whole piece polished and the porcelain crowns cemented to place, we now have our bridge ready for the mouth, and if proper care and exactness have been observed, and your abutments have been so made that they are absolutely immobile on the models, you can cement your abutments to place without even trying it in, and the saddle will go to place and fit as do these specimen pieces which I shall show you in my clinic. (Fig. 1.)

The applicability of these attachments is so great that it would be futile to attempt to mention all of their possibilities. One of the most valuable I consider to be that of the lower extension bridge (Fig. 6), supplying one or two molars or two molars and a bicuspid, and can be used in either long or short bite cases, as you will see by the models which I shall present.

Another application is for a double lower extension with iridio-platinum bar connection.

I have also supplied a full upper on four abutments, and an upper of ten teeth on five abutments, illustrations of which I present herewith.

I also have used this system successfully in an upper extension, supplying two molars and one cuspid on the left side. In this latter case I used the sliding hinge in the mesial end, with the box for its reception in the first bicuspid and cuspid on the side to be supplied, and from the distal end of the saddle ran a half-round iridio-platinum bar across the roof of the mouth, with a split bar attachment in a cast gold molar crown on the right side.

I recognize, I think, as well as anybody, the many faults which still obtain, and how far short this work comes from meeting our ideal. One thing which must be overcome, and which will be overcome by some of our geniuses is, that of the immobility of the saddle. There should be some play between the saddle and its abutments, to allow for the difference in the kind of stress which is applied to the cuspids, bicuspids and molars, in performing their various functions. As the bridge is now constructed, the action of the stress in mastication on the part of the molars is communicated to the cuspid, and nature never intended that the cuspid should perform the same sort of work, or be subjected to the same form of stress as the molars, and there should be some compensating play at the point of attachment, between the saddle and its attachments.

Another possible application of the split bar I shall illustrate with a model in my clinic tomorrow, wherein I have found it impossible to use the hinged joint attachment, and was compelled to use an open box with a split bar attachment in both abutments similar to the mesial attachment which I showed you in Figure 1.

In closing, I wish to express my thanks to Dr. William H. Taggart for his casting methods, to Dr. H. E. S. Chayes, of New York, for his development of the cast gold crown on a platinum base, and also to Mr. H. A. Gollobin, of Newark, who made for me the beautiful technical work which I have shown you this afternoon, and who is largely responsible for the development of these attachments.

## DISCUSSION.

WESTON A. PRICE: In order that I may speak briefly and plainly, I have undertaken to do so with the aid of illustrations, and while the Secretary is placing them on the hangers I am going to ask you why you make bridges at all. In order that we may discuss this particular method of bridge work, I wish us to develop in our minds an ideal which shall be the nearest possible approach to the conditions provided by nature. This ideal will require that our restorations shall have all the facilities for cleanliness that obtained with the natural teeth, if possible. There shall be no irritating surfaces to jeopardize future health of the tissues supporting them. Our attachments to the teeth shall be such that they shall not tend to shorten the life of these teeth. We will distribute our material so that we will get the maximum efficiency and durability. Let us analyze this bridge then from these three standpoints, namely, cleanliness, lack of irritation and strength.

In the first place, Dr. Ash has brought to us a plan for removable bridge and before going further into the discussion of his admirable paper, I wish to express my very high appreciation and gratitude to Dr. Ash for leaving his busy practice and bringing us this message.

Why has he suggested a removable bridge? Very clearly because it, presumably, complies more perfectly with one of these three requirements, namely, cleanliness. The very name removable bridge implies that it quite perfectly fulfills the requirements of ideal cleanliness, and that thought is not only conveyed to the laity but is in the minds of a great many men of the profession. Unfortunately, this is one of the greatest errors that our profession has been laboring under, for many of the so-called removable bridges are the most unsanitary operations that are placed in the mouth, and while I welcome, most enthusiastically, every effort that is made to make greater cleanliness possible, I feel it my duty to call our attention, in a rather definite way, to the reasons for our inefficiency. We assume when we remove a removable bridge and thoroughly brush it that we have rendered a complete prophylaxis, yet how many of our patients are able to properly cleanse the attachments that are fixed in the mouth, and it often happens that the surfaces that cannot be cleansed in these attachments will have a greater square area than the surfaces that could not be reached and properly cleansed had the restoration been made in the form of a fixed bridge, and just here we will find a means for determining the design of many of our bridges whether they shall be fixed or removable. If we will measure, very carefully, the area of our surfaces in the two attachments that remain in the mouth with Dr. Ash's fixed bridge and plot them out in an oblong area, we will not only find that these total surfaces are relatively great, but are probably twice as great as the area that could not be reached with a brush under a fixed bridge placed in this same space provided that fixed bridge could be constructed with a long tooth and with very narrow base in contact with the gingival tissue. This will be seen graphically illustrated in figure No. 1, where the upper block, A, represents the total amount of surface by actual measurement in the two foundations that cannot be reached and the narrower black band below it represents the surface that could not be reached with a brush had a fixed bridge been inserted with a narrow contact point which, I repeat, would have been possible only where the teeth could be long.

Let us study this bridge again from the standpoint of the irritation to the gingival tissue. We will assume that a sound cuspid and a sound molar had been respectively excised for a special porcelain-faced Ash box crown and a gold crown with a receiving chamber. When we revert to our standard of ideal conditions we are compelled to acknowledge that no environment is as satisfactory as nature's own for the gingival tissue, and at best we have not as good a condition with a foreign material as we would have had had we left the normal enamel for a contact with the gingival tissue. In order to cut away enough of the molar for this receiving chamber, the pulp should be removed and almost the entire lingual wall cut away. Hence, we have produced a foreign and artificial environment for practically the entire gingival tissue surrounding both abutments. From this standpoint, then, we must recognize that this bridge does not approach our ideal. Had a fixed bridge been placed in this space with a sufficiently strong post entering into the pulp chamber of each of the foundations and with an inlay properly supporting and protecting each foundation from fracture, we would have produced a foreign environment at most, on only one of the four sides of each tooth.

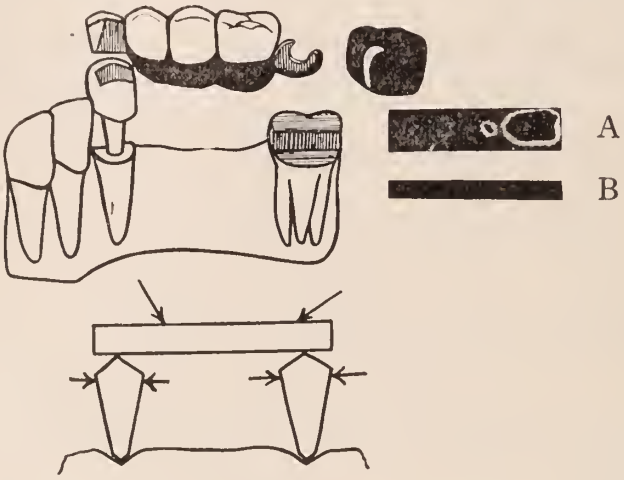

Fig. 1.

Let us now analyze this bridge from the standpoint of strength and rigidity. We will find on analysis that if it were attached to loose abutments, there would be some hinge motion at the point of bearing, which would be in proportion to the play in the boxes and the freedom for movement of the root, which will be illustrated in a diagram in the lower part of figure No. 1. Let us suppose a glancing forward pressure is made on the molar in the direction of the most leaning arrow. If the cuspid root is loose at its gingival attachments, almost the entire strain of this thrust will come on the fibers forming the attachment to this loose molar root, for the molar attachment from its very construction is made to offer no resistance when the cuspid end of the bridge is raised, for that is the principle of removing it. Had this restoration been made by means of a fixed bridge with posts in the roots, the strain of this same force would not come upon the fibers forming the attachment at the side of the root unduly, but would be transferred to the apex of each tooth, which is sitting in a definite socket. We all know that many teeth are loose, not because of faulty nutrition or attachment, but because of overload, and that these same teeth become firm when properly staid to each other, thus preventing their individual motion.

I am very anxious that these apparent criticisms of Dr. Ash's form of bridge be understood to apply to all forms of removable bridges that have similar weaknesses, and some of them are in error more gravely than this type. If, for example, we will study the so-called split pin removable bridge, as illustrated in figure No. 2 we will find that conditions are, if possible, even worse so far as cleanliness is concerned, for the amount of the surfaces comprising the fixed tubes in the roots of the two teeth, when spread out flat will be found to be equivalent to the large square, for the area of surface that cannot be cleansed in those tubes will be three and one-seventh times the diameter of the tube by the length of the tube plus the floor or bottom of the tube as shown in the large square in figure 2. Had this same space been filled with a fixed bridge with a narrow contact point on the gingival tissue, the amount of surface that could not be reached and cleansed with the brush, would be represented by the narrow block beneath the illustration in figure No. 2.

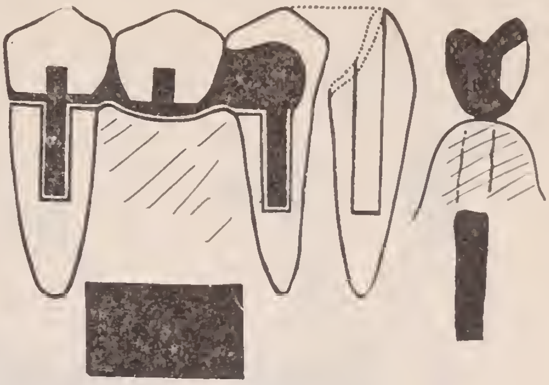

Fig. 2.

But those who are making fixed bridges according to the designs that have been in vogue in the past, must not suppose for a moment that they have been less seriously offending in this matter of cleanliness. If we will study chart 3 in which we have measured, quite accurately, the amount of square surface underneath the single molar tooth where the broad saddle type has been used, will be represented by A. Had a design of bridge construction been used which provided for a narrow contact point at the gingival line, assuming that a long tooth could be used, the amount of surface that could not be reached with the brush underneath that same tooth could be represented by the black bar marked B. Another great weakness in this saddle form here represented is the faulty distribution of the metal for strength, to which we will later refer. But there are other forms of fixed bridges that are very much in vogue that are even more seriously at fault in this matter of cleanliness. If you will refer to figure No 4, and first note the middle illustration, you will see the so-called "cleansing space" provided. If now you will measure the square area under this single tooth that cannot be reached with the brush, and spread it out flat, you will find it represented by the large square beneath it, and had this same case been restored with a bridge of the narrow gingival contact type the amount of surface under this tooth would be represented by the very much smaller band of black shown at the left. There has been a tooth form given to the profession recently with a very extensive buccal projection, but which, unfortunately, adds to this serious sanitary error in bridge construction, for the amount of area underneath this single tooth

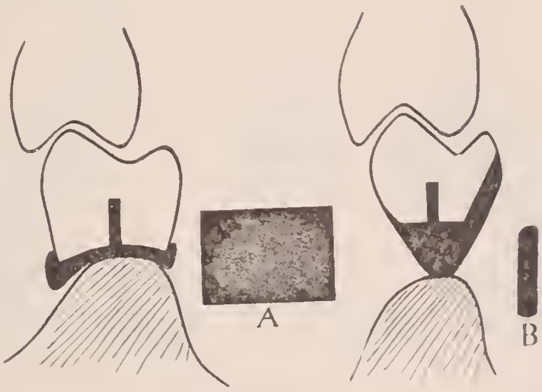

Fig. 3.

that cannot be cleansed is shown by the very large block of black in the case at the right, which need not have been greater than shown in the case at the left.

If we will turn in our minds to our ideal as applied to lack of irritation, namely, "no more irritation than with the normal tissues and environment," and then refer to figure No. 5 and study the source of nutrition for the attaching fibers of the teeth, we will find that we are likely to fall far below our ideals in our daily practice. Figure No. 5 shows diagramatically the method of suspension of the tooth in its socket. These fibers receive their nourishment for their structure and attachments largely from vessels entering and leaving at the gingival border. This is particularly true of those fibers nearest the border, while those nearer the apex receive their nourishment more largely through the alveolar tissue. If now we introduce an irritation which produces destruction of tissue and infection in the path of this stream of nourishment, namely, the blood vessels entering the gingival tissue, we have embarrassed and doomed the health of the fibers fed by those streams, just as the placing of sewerage in the springs that supply the city. Who is there in this room who has not seen many teeth where a gold crown was irritating the gingival tissue about a molar or bicuspid, which tooth had become very loose and which tightened almost to normal condition very soon after the crown was removed. I do not wish to infer that Dr. Ash makes gold crowns so ill fitting as that shown in figure No. 6, but I wish to illustrate the fact that these leading-in vessels from the gingival tissue, and their influence and injury are very much more serious when all are involved than when only one or two have been, otherwise the uninjured ones can take up in part the work of those infected. The direct application of this is

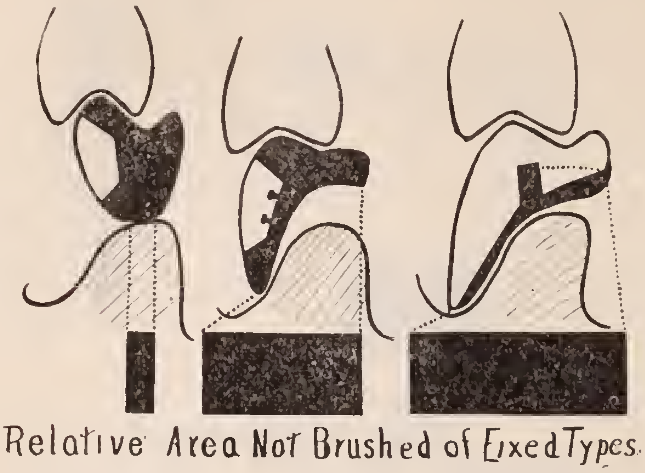
Relative Area Not Brushed of Fixed Types.

Fig. 4.

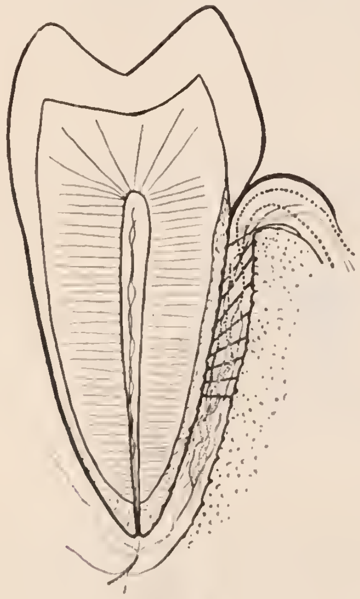
Fig. 5.

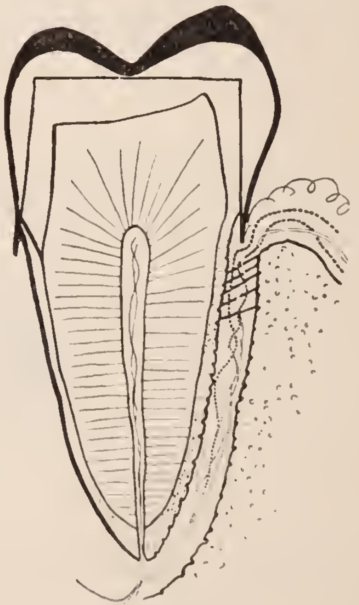
Fig. 6.

that an inlay producing some irritation on one side of the tooth is much less serious than a crown irritating to the same extent all around the tooth, and we have done most to insure the health of the attachment of the teeth when we have done most to preserve the natural environment. This is graphically illustrated in figure No. 7, which shows a bicuspid with a cavity on the distal surface involving part of the occlusal. It is to be used as an attachment for a bridge by an inlay with a post in the root, and a preparation that will properly protect and lock the tooth wall from splitting can at most only irritate the gingival tissue at one margin, where had it been crowned with a gold crown, it probably would produce some irritation on several, if not on all sides as shown.

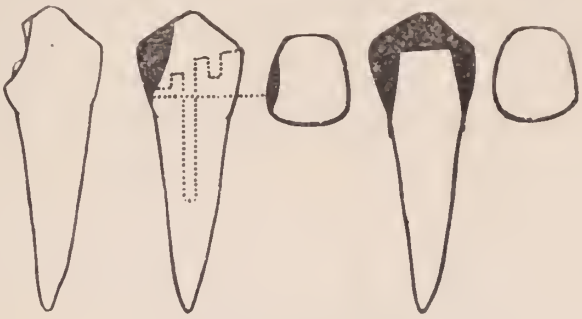

Fig. 7

We will now observe the strength of the attachments, and it is here that our profession is, if possible, using less of exact science than in any department of its practice. The principle ''factor of safety'' seems to be almost unknown in the practice of dentistry as applied to the construction of bridges, while it is an essential element in the construction of even the crudest of our municipal structures. Figure No. 8 illustrates some of our common engineering failures. At the upper left hand we see two ordinary soft platinum pins taken from a porcelain facing used as the attachment and anchorage for a bridge. Needless to say they were torn loose in a very few weeks, but the tragedy is that the operation was made by a man with a national reputation. The next or center one at the top shows the so-called open faced crown, which is merely a strap surrounding the tooth and might about as well be leather as soft gold. Fortunately, the illustrations of this weakness have been so many that few are using it today. In it the ''factor of safety,'' when figured, is shown to be exceedingly low. In the next to the right at the top where the pin has been placed lingually to the pulp so as not to disturb it, the tooth wall has not been strong enough and has fractured away. In the middle, to the left, the pin entering the root is of too weak a metal and too small, and has too small a ''factor of safety'' for the load it has to carry. In the center to the right the cast base for the crown, when soldered to a gold crown, has broken because the cross section strength is too small, due to

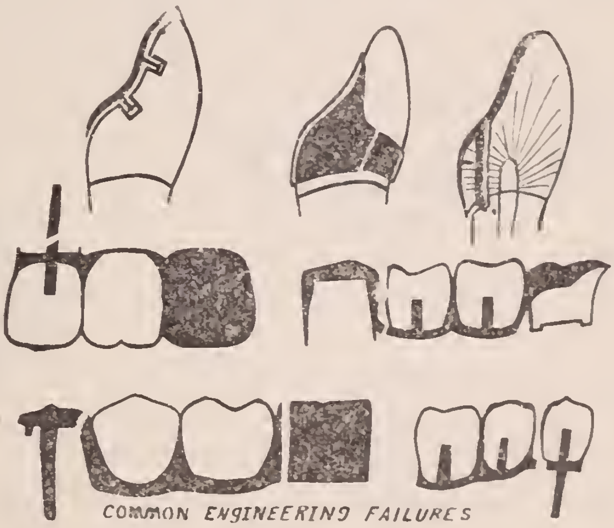

Fig. 8.

faulty distribution of the metal rather than to lack of quantity. To the left at the bottom the cast inlay which has not been properly reinforced with a bar in it has broken for want of proper distribution of the metal. In the same bridge the gold crown has cracked because the wall of the crown is too thin, below at the right a cast crown base has broken because of faulty distribution of the metal. These are only a few illustrations of our lack of application of the simplest and first laws of engineering.

If we will look at figure No. 9 for a few minutes and study the relation of the strength of a mass of metal to the direction in which the force is applied, we will find that if the cross section is one by two, the edge strength is to the side strength as eight is to one—in other words, as the cube of their difference. If the bar is one by three, the edge strength is as twenty-seven to one; if one by four, the edge strength is as sixty-four to one; if one by five, the edge strength is as one hundred and twenty-five to one; if one by six, the edge strength is as two hundred and sixteen to one, etc. When we apply this principle to bridge construction, we will readily see why so many of our bridges break, for nearly all of the failures in bridge work are due to our failures in engineering, and would not have occurred had our profession a proper training and practice along these lines. Again let us note the relation of our material to the length of the bridge. How universally we see long bridges built on the same mechanical lines as short ones, without any recognition of the law, that for doubling the length we must, for the same strength, double the depth or edge strength of the piece, where for the same doubling of length if we get our increase in strength by increasing the width, we must multiply it by eight.

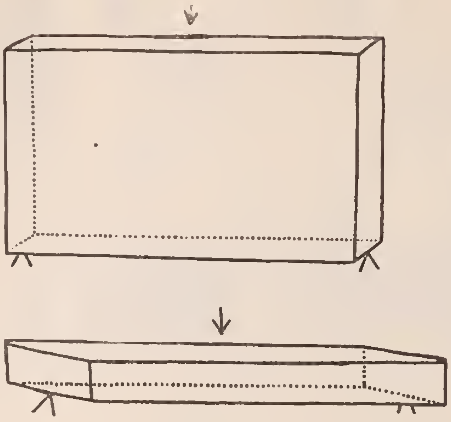

Fig. 9.

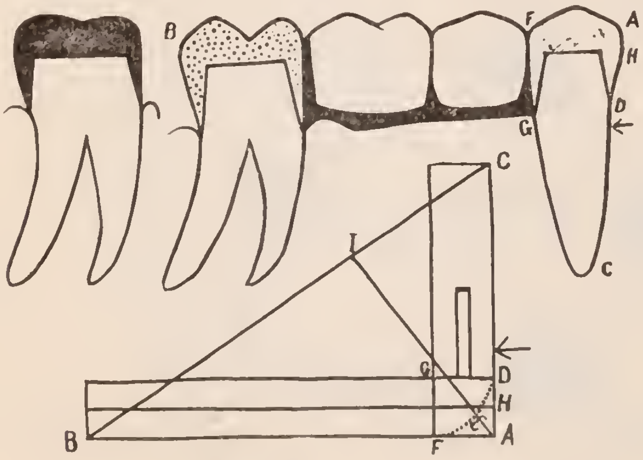

Fig. 10

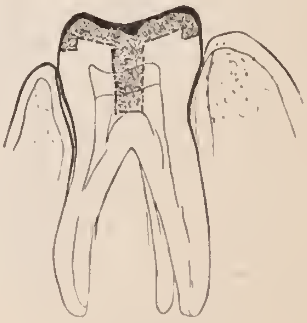

Fig. 11

If we will apply these laws to the construction of a gold crown for example, we will readily see in figure No. 10 why so many gold crowns leak around the base or buckle and split, when used as a bridge attachment. The leverage as applied to the side of the shell of the crown requires that the thickness very rapidly increase in proportion to the leverage stress. If the strength of the bridge is represented by

AB, and the depth of the crown by AD, the leverage stress for a force applied in direction of BC, which would be represented by a rotary masticating motion of the teeth, would be equivalent to the leverage of a lever IE operating on E over a fulcrum G. This requires that the gold forming the shell of the crown must have sufficient thickness to withstand this leverage stress. Dr. Ash has avoided this strain on his crown by the fact that his bridge has a loose attachment, is not rigid, but has a hinge effect. On the other hand, his method of construction for the gold crown for the molar is such that it should, because of its re-enforcement, easily withstand a heavy load. His method of construction does not, however, fulfill the third one of our requirements for an ideal bridge, namely, a maximum of rigidity and strength from the standpoint of supporting the roots in their sockets to the greatest possible degree. In this connection, I wish to present what I believe to be the strongest possible attachment that can be made to a molar crown, which is shown graphically in figure No. 11. It requires that the pulp be removed, that a post be inserted into the pulp chamber, that the entire occlusal surface of the entire crown be covered, but that the dentine of the crown be left nearly in contact except for the perforation that goes through to the pulp chamber and a shoulder for a ring or ferrule of gold, which shall surround the dentine to a short depth, thereby preventing the splitting of the crown. If, however, the margin of this restoration must approach a contact point, it should be carried below the contact point, and that the side of the tooth from which the bridge will be carried should be carried to the margin, of course with the removal of the contour.

This preparation does not require the removal of the entire enamel of the crown as does Dr. Ash's preparation, and, hence, preserves the normal environment.

Dr. Ash's method of bridge construction has some very desirable features and I am sure does not yet fulfill his own ideals, and he, no doubt, will shortly give it to us in a so perfected form that it will satisfy the ideal requirements of cleanliness in the attachments as well as the removable section, and the necessary rigidity for supporting already loose overloaded teeth.

**Dr. W. O. Hulick**, Cincinnati, O.: This society is most fortunate to have Dr. Ash present a paper for our consideration on a subject that is of vital importance to all of us, and vastly more so to those needing services of a mechanical nature.

I have read Dr. Ash's paper with a great deal of interest; I have carefully studied it so as to be familiar with every technical point. I have made a careful analysis of this scientific and practical application, and while at first the technic would appear difficult to some, the result is apparent from a sanitary, physiological and mechanical standpoint.

The method is new, unique and positive, and will fill a long-felt want in many cases. Almost all of the methods so far brought out, I have employed successfully and I will surely put this one to a practical test at once.

Why am I an advocate of removable bridge work, do you ask? Why should we all be advocates of this method of replacement?

*First*—It is the most sanitary.

*Second*—It is the most scientific.

This is an age of sanitation—it is an age of advancement in science. It is an age when our clientele demands the best service obtainable.

This is a time when the people the world over are being educated in Oral Hygiene, clean mouths, and how to keep them clean; prevention, rather than cure—and removable bridge work will play no small part in this work.

It is a well known fact—undeniable, if you please—that most fixed bridge work is not sanitary. Dr. Tileston and many others have said that no fixed bridge work is clean, and cannot be kept so. However, in spite of these facts, it will be used, in moderation, until the end of time, but will be more carefully constructed, also cases will be more carefully selected for its insertion, so as to reduce the deleterious conditions seen every day.

With the method Dr. Ash so ably describes, also some others worthy of our notice, mouths needing partial restoration can be kept clean, as clean, we must admit, as the individuals are in the habit of keeping them, where no replacement is used.

The bridge can be removed, sterilized, teeth used as piers thoroughly cleansed around the necks, bridge replaced with a feeling of cleanliness and satisfaction that cannot be felt with any fixed replacement.

In malposition, Dr. Ash's method will fill a long-felt want in removable bridge work; not so with some other methods where an alignment is absolutely necessary.

I find from a careful study of his method that, however bad the conversion, as for instance in the lower jaw, where two molars or one bicuspid have been missing for some years, a replacement can be made absolutely positive in its adaptation. I also note with great satisfaction the strength of the replacement, overlooked by most dentists. We are obliged to observe these points in the construction of all bridge work, whether fixed or removable.

It has been my pleasure to bring some of these points out of late, and will take this occasion to emphasize the great necessity for strength in all replacements to withstand the force of mastication, or pounds' pressure in the preparation of food.

With Dr. Ash's method, where employed posteriorly, a saddle is used on and over the ridge to receive and resist part of the impact, thereby helping the teeth engaged as piers in their work. This, to my mind, is of great importance, inasmuch as each tooth is only expected to do its own work.

Now, when we consider the great amount of work required of teeth in the act of mastication, and when we consider the pounds' pressure on bridge work in the act of mastication, it must follow in our conclusion that the work must be made very strong in its construction, very scientific in its application and the ridge must be covered with a saddle wherever possible to help do the work imposed.

This saddle can be used only in removable work of some kind which brings us to another conclusion: that more removable bridge work will be employed in the future, for three reasons, at least.

First, it is more sanitary; second, the ridge will do the part of the work of the teeth lost; and third, the spaces are completely filled and contoured to nearly their natural condition, making the replacement more comfortable and satisfactory to the wearer.

I wish to observe a few technical points of the method described. First, I wish to call your attention to the cement model, which appears ideal, and as I understand it, it is made thin, or in form of a shell, being filled out with plaster. I should like to ask Dr. Ash to explain to us something about making this model and how he makes the plaster adhere to the cement shell. I have used quite successfully Dr. Price's artificial stone for models and would like Dr. Ash to compare the two for our benefit.

Again, I wish to call your attention to another technical point, the copper tube described by Dr. Ash, which I consider most valuable and new, at least to most of us. It has been my pleasure to use this method a few times, using platinum foil instead of the copper, and have found it to be positive and satisfactory in every way where you wish the base and pin to leave the model for strengthening, attaching backing and facing and subsequent soldering after other parts have been assembled.

I note with great satisfaction another point in his method, and that is a shell for molar that fits like the skin on an apple. Few men, I fear, so construct their crowns; and here lies the cause for many failures in crown or bridge work. I wish to ask Dr. Ash how he swages such a shell. The technic of split bars and boxes to receive them is so positive there seems no reasonable excuse for failure, even in the hands of men of average ability.

One point of interest, which cannot be called a criticism, that I wish to call your attention to, is that of interdental spaces at distal cervical of cuspid, and approximal cervical of molar as in the case Dr. Ash described. With this replacement the split bars fit closely to tissues, almost to gingival margins, especially so where there is a very short bite. Now this cannot be, to my mind, a serious objection, inasmuch as the bridge is removed at will and teeth so engaged thoroughly cleansed and sterilized, so to speak, with some antiseptic mouth wash. The above condition is true also with many fixed bridges and removable partial plates where various attachments are employed, causing food to lodge and decompose, inviting decay and subsequent destruction of abutments at times.

In this connection I would like to ask Dr. Ash regarding these very short bite cases; cases where it would not warrant extending, or jumping the bite. These conditions are perplexing to substitute with any replacement to make them sanitary and strong enough to do the work imposed. No one appreciates the necessity of clean mouths more than I do, and no one deplores the septic conditions that some bridges and partial dentures cause.

Now, in conclusion, I wish to make this statement, that while I am free to admit crowns, fixed bridges and partial plates do cause these conditions, the patient is at fault very often in the lack of care and cleanliness which may cause this septic condition and subsequent loss of replacement, where, on the other hand, it might give good service for an indefinite period. All of this can be obviated, in my opinion, by the removable method. However, it is prohibitive in many cases on account of fees and also on the other hand by operators who are not capable of carrying it to completion.

Again I wish to thank and compliment the essayist for his able presentation of a subject that should prove very beneficial to us all and vastly more so to those we serve.

**Dr. H. F. Methven**, Cincinnati: The society is to be complimented on having a paper of this caliber presented this afternoon, and I am pleased to have had the opportunity of hearing it, as it is another step in the advancement of our noble art and science.

It is an appalling fact that when a patient presents himself for dental operations, and upon examination of the mouth it is found that several of the natural teeth in close proximity to each other have been lost through caries or other means, the first thing the average dentist thinks of in the way of replacing these lost organs of mastication is by means of a fixed bridge.

In my thirteen years of clinical experience, this fact has been forcibly impressed upon my mind from the many failures I have seen, and which can be laid at the door of the operator, through poor judgment in selecting the proper kind of a substitute for the case. In many of these cases where bridges of the fixed type are placed, a partial plate or a removable bridge would have given the patient better satisfaction in the way of utility and comfort, saying nothing of the loss of other teeth. As you will note from the essayist's paper, removable bridges are applicable in many of these cases, but they are especially indicated where a great deal of absorption has taken place or where a considerable amount of hard or soft tissues has been lost through disease, an operation or by accident. First, from the esthetic viewpoint, as the lost tissues can more perfectly be restored and the face given its proper contour. Second, for hygienic reasons, as the patient can remove the appliance and keep the parts clean. Third, that they are more comfortable for the patient to wear, as they are not as cumbersome as a denture.

If a fixed bridge were placed in a case just cited, and much restorations were attempted, it certainly would invite the lodgment of food, and in a short time become so odoriferous that one would not care to stand very close to the person wearing it during a conversation, though it might be short and sweet (I mean the conversation).

There are a few points of interest in the paper which the essayist has not emphasized very much and which I should like to call your attention to at this time.

The first is that while it is not absolutely necessary to have the abutment and piers parallel with each other, the attachments must be, or when the bridge is completed and placed in the mouth, it will prevent its removal and the object for which it was constructed would be lost. He failed to mention by what means he procured this parallelism, and which I stated above was very necessary.

There are several varieties of appliances used for this purpose. They are called jigs, and can be procured at any of the supply houses. The one that I prefer, and which will answer all purposes, was invented by Dr. J. B. Morgan, of Davenport, Iowa.

The essayist states that the abutment and pier crowns can be permanently set without trying the bridge in the mouth and that it will go to place as well as it does on the model.

This is true in many cases, but I prefer to put the crowns which hold the keeper portion of the attachment on their respective anchors, and seal them there with some soft wax. Then carry the piece to place in its entirety, and cement the crowns all at one time, which, in my judgment, insures a more perfect relation of the crowns and attachments to each other.

The wax is used for two purposes. First, for carrying the several parts to place in the mouth, and second, to prevent the excess cement finding its way into the attachments.

If this precaution is not taken and any of the cement should be forced into the attachment, it might be impossible for either patient or operator to insert or remove the bridge. The wax can easily be washed out with warm water after the cement has set and the excess has been removed.

Another thing—during the soldering or casting process, great care must be taken to see that none of the metal used in either of the processes is allowed to attach itself to those surfaces of the attachments which interlock each other. If this should occur, the reconstruction of the attachment would probably be necessary.

To prevent this, I paint those surfaces thoroughly with an antiflux prior to investing, using either the one put on the market by the Steele facing concern, or one I make myself, using whiting and alcohol to which a little gum arabic is added. The latter is used as a sticking medium only.

Another thing you must not lose sight of in constructing bridges of the removable type is that there are no sleight-of-hand performances connected with it nor slip-shod methods, but careful and exact steps, and each following in its respective order.

In closing, I wish to beg the pardon of the members of the Society for taking up so much of their valuable time, and also the essayist's for not being able to give a more scientific discussion of his paper. But as the paper in most part is given over to the description and technic of making a particular kind of an appliance or attachment, it gives one very little opportunity for discussion, and especially so since I have not had the pleasure of making a bridge using this attachment. Consequently, I cannot offer any suggestions for its improvement or for shortening the method of its construction, but will assure you by this time next year I will have made one.

And now, with my last few words, I wish to compliment you on your achievement, saying to you "Good, my boy—well done!" I thank you!

**Dr. J. R. Callahan**, Cincinnati: While in New York recently it was my good fortune to see several of Dr. Ash's patients who had in their mouths bridges such as the doctor has been describing to us here today. Some of these bridges had been in use several years. The patients were able to remove and replace the bridge at will. If the pieces had worn loose in any way I was unable to detect it. One of the patients who was wearing a rather extensive bridge invited us to luncheon, that he might prove to us that he could masticate any food that he might choose.

One of the most striking features of Dr. Ash's work is the accuracy of his models. When the piece fits a model of such accuracy it goes to place in the mouth without any alteration whatever.

This may sound like an extravagant statement, but "seeing is believing." I have seen Dr. Ash turn the trick. So when you go to Dr. Ash's clinic, study closely the making of the models. There is also a deadly accuracy about the attachments. Once you get the principle on which they are constructed it requires only time and patience to work them out.

Such bridges are not for the "cheap man." They call for a good fee, and are worthy of the highest appreciation.

**Dr. Ash** (closing): I want to thank the gentlemen who have taken part in the discussion.

Dr. Price mentioned the word "occlusion" when he gave his discussion. There is so much that could have been added to the paper, as I read it, in regard to the necessary steps for successful work in any class of bridgework, that it seems to be out of place to do those things. One of the things which should be added, if any, is the question of proper occlusion. Another thing is that of the proper contact. Another thing, that of the proper observation of the steps of all those things. should be added, but it would take too long a talk in order to cover all these points. I opened my paper by saying—or else I said somewhere in my paper—that I recognize the places in which older methods still obtain, from which work I get very many new ideas. I recognize that if it were possible to take out the removable portion of the bridge and the abutments as well, and sterilize fully, we would be making a step in advance. That isn't possible. It never is possible for me to attain the ideal in making any kind of illustration, therefore the thing for us to do is to approach as nearly as possible that ideal—my ideal in making that form of the removable bridge—and I get as near my ideal as I have been able to come.

Now I take exception. I do not wish to take exception to too many things, because it will make this discussion too long. Dr. Price also spoke of keeping the part clean under the saddle. I had in my office some four or five gentlemen who came down to see some of this work. I showed them three or four patients, some of whom had four bridges in their mouth. It was one of those times that Dr. Callahan spoke of. I did that just to illustrate that point, that if the models are correctly made the bridge and abutments must fit the mouth, and it happened to fit. But the first bridge which I had made for that gentleman was placed in his mouth two and one-half months prior to that appointment. When he came after the first bridge was set, I asked him to remove it; but I found it was in so tight that I left it there and proceeded with the manufacturing of the second bridge, and then with the third and fourth bridge,. In the meantime the first bridge had not been removed, although it was supposed to have been a removable bridge. It was in his mouth two and one-half months. I explained these circumstances to the gentlemen; I don't remember just exactly who was there—there were two or three Chicago men in there at the time, who saw this thing, and I had these gentlemen assist me in removing the first bridge which was put in. I had to ease it up—it was so tight—in order to make it possible for me to remove it. When that was removed, I was very careful to so remove it that the under part of that saddle should not come in contact with anything; and I said: "Now we will just see how much accumulation of filth there is under this saddle;" and I will give you my word that the saddle that was just placed in the mouth was no cleaner than this one which was in there over two months. I am telling you this for two reasons—because I want to show you that this model may be kept clean, and because I think it is fully proven that the gum and the saddle resting on the gum take up a very large part of the stress of mastication.

Dr. Price brought out the point in regard to the rigidity with which the abutments are held together as being rather an ideal. He criticises the point which I made in having a little play. I do not agree at all with Dr. Price's point in regard to the application to that part of the mouth. My point is, that in this bridge, if the saddle on the gum is built up so that the abutments are free of stress, these abutments will last much longer than they would if a box portion was put in which simply made it possible for the dummies to touch the gum at a point like that, where these abutments would have to carry all the stress of the work that was done by five teeth. I try to see it the other way, but I can't see where there is any possible reason for the other standpoint. Part of the stress is taken up by the gum, and these two abutments have less work to do and they are going to last longer in that mouth than if they did the work of five teeth.

In regard to the matter of irritating bands which was brought up—now, Dr. Price said he maintained that if a band was put around the tooth it would diminish the supply of blood which kept that tooth in this socket unimpaired. There is no question about that. If the blood supply is diminished, you will probably lose that tooth in a short time. When you make a platinum shell, have it fit that tooth, as I said before, have it fit as tight as the skin on an apple—(few persons in audience laughing) and I think there is room for a laugh, but I don't think the laugh is on the platinum shell. The laugh is on the other crown. Every man who had a conscience would find it almost impossible to make the old-fashioned crown. You can make a platinum-shell crown and have it fit so closely that it is not perceptible. I am going to show you in my clinic tomorrow.

Dr. Price spoke about the gold crown *vs.* the gold inlay. I don't feel like talking about that because that isn't pertinent to the particular bridge which I am speaking about. I don't think I have time.

One thing that he took up was the question of the geometrical problem. I am glad he brought that up, because it relieved my embarrassment for not bringing up anything about these geometrical problems in my paper. I think Dr. Price has lost sight of the basic principle involved in this proposition. He lost sight entirely of the fact that there is a certain amount of mobility in the reach of each tooth which must be taken into consideration in getting those stresses.

He spoke of the factor of safety in large buildings and that the factor of safety should be considered in building all bridges in the mouth. So far as the stress or restraint is concerned there should be a factor of safety considered where it is possible to make room for it; but gentlemen, we are not building with conditions such as those which obtain when you are putting up a building. The engineers can say that the foundation must go down so far; that the size must be so and so; that it must bear a certain factor of safety. Those things can be carried out because they can make the necessary conditions. We do not make our own conditions. We have to take care of the poor, weak things that are left in the mouth and do what we can with those, and the factor of strength is limited entirely by the strength of these roots.

Dr. Hulick spoke about conversion or diversion of abutments. That was one of the points in this bridge. I have made the abutments come down to the roots, say, in any such angle—and those things are very good—but it struck me that this was a little simpler way to do it. You can take these roots at any little angle, and especially where you have a large case of four or five abutments, on different sides of the mouth; they may be changed to any angle.

Dr. Hulick asked about the cement, I believe. I don't think there is much of a trick about making the cement model and there is not any mystery about that. After the impression has been taken and the abutments placed in the impression, you fill up the first proof of the impression until all of the abutment that can be seen is simply filled up with cement. If you consider the likelihood of any trouble it is a simple matter to take a staple and put it in the cement.

He also spoke about tubes of platinum foil. I don't think here it would be necessary to make a tube of platinum foil. If you will simply take your tube, take a piece of copper and put it around your band and punch it around, you can cut that off, and it will go right into your abutment and help hold it in place. Then, when it is finished, of course the rest is covered by the abutment, and nothing of that shows. I don't think it is necessary to use platinum. A piece of copper will answer that purpose just as well as an expensive piece of platinum.

Dr. Hulick brought up the question of fees and the difficulty of doing the work. I wasn't going to say anything about it, and as a matter of fact, I can say now as the question has been brought up, that it is one of the reasons why I would rather abstain from bringing this subject to your attenion. This bridge requires so very much time that I don't think the average man would feel that he could afford to take the time to do it; but I feel that the averoge man is wrong in taking that attitude. I believe that if I could know the number of men in this city who were doing a practice of so much and no more—and how few men are doing a practice of more than so much—I would be amazed. This is pertinent to the subject. You gentlemen are afraid to do this kind of work because you are afraid you can't get the fees for it. How many people are there living in this city who are more than millionaires—or to make it a little bit easier—how many people are there in this city who can afford to maintain an automobile? If they can afford to buy and maintain an automobile, they can afford to pay for a bridge. Now laugh! (Laughter) It isn't funny. If you can make those people see that it is a better thing to do to put that two thousand dollars in their mouth than in automobiles they will thank you for it. Most of you are not able to do this because you have not got the courage. There are enough people in any city of this size in the world who have money enough and can afford to pay the fees that are necessary to do this kind of work to the dentist who is able to do that kind of work. The people don't know they can get it. Have you ever told them they could get it? No. Why? Because you are afraid you could not do it. You are not fair with your patients. If you see that your patients need that kind of work, then the thing you have to do is to tell them that you can do it just as well as any other man can. It is not fair for you not to give your patients a chance to have this work done.

I don't like to mention price, of course; but I am going to say this—I don't think it is unethical to say this—this work in my office takes up so much time (but it can be made more rapidly than a man of inexperience would suppose) and considering the time it takes to make that work I don't believe it can be made and put in the mouth and get any profit for less than one hundred dollars a tooth. If that seems unethical to anybody, please pardon me, because I am only trying to give you a point that will help you.

Dr. Methven spoke regarding the parallelism of this kind of work. This is a matter for you to work out for yourself. There are a number of methods by which it can be made parallel, and there is a machine for the purpose being made now by Chayes. I am also going to make some instruments of that kind, and hope to show them to you in the future.

He also spoke about the cementing of the abutments at once. If you will just revert in your thought for a moment to what I referred in regard to the diverging of the abutments, you will see how almost impossible it would be to cement these pieces on at once. He also spoke about cement getting into the attachment. It is a very simple matter. It seems desirable when you are putting an abutment in, to push the removable part up in order to assure yourself of its correctness, and it is a very simple matter to take a roll of cotton and dip it into a little bit of vaseline and smear it inside of the box.

I don't think there is anything else that I want to talk about. I want to thank Dr. Callahan for what he said, and I want to thank you gentlemen for your kind attention.

## PULP TREATMENT*

BY J. H. KENDALL, D.D.S., COLUMBUS, OHIO

If a tooth has been aching for a long enough time to cause much inflammation of the pulp, seal in some sedative, allowing it to remain two or three days. Follow this with arsenic, colored red or black, because of contrast to tooth substance. Seal a small crystal of cocain with arsenic to prevent aching. Let this remain for 24 or 48 hours. In opening into the pulp chamber use a very large bur, one as near the size of pulp chamber as possible. In doing this you not only remove the pulp at one stroke but you make your opening large enough to gain access to all the root canals.

If there is no pain remove contents of root canals, seal in a small pledget of cotton that has been dipped into cresolform liquid and dried on a piece of blotting paper. If there is pain on going into the root canals let them remain until next sitting, using cresolform liquid on cotton as before stated, when you will find the contents so hardened that they come away very easily on your broach.

For getting at the root canals of the posterior teeth use a nerve broach that has been cut off about one and one-half inches from the barbed end, bend it at right angles at the smooth end and cover it with a small ball of cement to facilitate handling and you will have an instrument with which you can reach the inaccessible places easily. Finish treatment and filling of root canals in any manner you please.

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*Clinic at Ohio State Dental Society.

"My friend, if you want to find out something, let me tell you there is nothing like quiet watching. No matter where you watch you always see something. Animals understand this principle better than humans, and the wilder an animal is, the more patient he is about this watching game."

# Program Ohio State Dental Convention

## At Toledo, December 2-3-4, 1913 Don't You Dare to Miss It!

### TUESDAY, DECEMBER 2d, 1913—MORNING SESSION

9:00 A. M. to 1:30 P. M.—Registration.

10.00 A. M.—Opening of the 48th Annual Meeting. Reading of the Minutes. Receiving Reports of Committees. General Business Meeting.

11.00 A. M.—Meeting of the Board of Directors.

### AFTERNOON SESSION

1:45 P. M.—*Address of Welcome*—Mayor Brand Whitlock.

2:00 P. M.—Inlay Symposium: Lecture, "*Accurate Reproduction of the Tooth Cavity by the Impression Method*," Illustrated. Dr. F. T. Van Woert, Brooklyn, N. Y.

Discussions.

*Cavity Designs*—Dr. John V. Conzett, Dubuque, Ia.
*Model Methods*—Dr. Edward Spalding, Detroit, Mich.
*Complicated Conditions*—Dr. Karl G. Knoche, Chicago, Ill.
*Requirements for Porcelain*—Dr. A. E. Schneider, Chicago, Ill.

General Discussion

5:00 P. M.—Election of Officers.

### EVENING SESSION—*"President's Night"*

7:45 P. M.—*President's Address*—"*Some Contributions to Dental and Medical Science.*"—(Report of Personal Research)—Dr. Weston A. Price, Cleveland, Ohio.

Discussion—Dr. Edward C. Kirk, Philadelphia, Pa.

## CLINICS

### WEDNESDAY, DECEMBER 3, 1913—MORNING SESSION

*Post Graduate Course given in Progressive Lecture Clinics by Star Clinicians.*

For full directions how to attend the Clinics read carefully the instructions given on cards distributed during the meeting.

9.00 A. M.—Distribution of Admission Tickets to the Clinics. Only members of the Society, guests and those from other states giving evidence of membership in Dental Societies will be admitted.

9:30 A. M.—Clinics Begin—*On Time!*

1. *Inlay Technique*, F. T. Van Woert, Brooklyn, N. Y.
2. *Cavity Preparation*, J. V. Conzett, Dubuque, Ia.
3. *Some Properties of Vulcanizable Rubber and How to Control Them*, Geo. H. Wilson, Cleveland, Ohio.
4. *Removable Bridgework*—Alden Bush, Columbus, Ohio.
5. *Serum Treatment of Pyorrhea Alveolaris*—(Wednesday only), Dr. Louis W. Ladd, Cleveland, Ohio.
6. *Porcelain Crowns*—A. E. Schneider, Chicago, Ill.
7. *Prophylaxis and Pyorrhea Alveolaris*—Thos. B. Hartzell, Minneapolis, Minn.
8. *Crown and Bridgework*—Karl G. Knoche, Chicago, Ill.
9. *Borated Oxygen Treatment of Pyorrhea Alveolaris*—F. H. Skinner, Chicago, Ill.
10. *Practical Prosthesis*—J. H. Prothero, Chicago, Ill.
11. *Serum Treatment Pyorrhea Alveolaris* Geo. W. Harris, Detroit.
12. *Gold Restoration vs. The Cast Filling*—J. M. Thompson, Detroit, Michigan.

(OVER)

13. *Cavity Preparation*—M. L. Ward, Ann Arbor, Mich.
14. *Removable Bridgework*—John L. Kelly, Chicago, Ill.
15. *Accuracy in Dental Casting*—F. L. Olds, Toledo, Ohio.
16. *Diagnosis and Treatment of Antral Diseases*—S. M. Weaver, Cleveland, Ohio.
17. *Nitrous Oxide Gas and Oxygen Anaesthesia*—W. I. Jones, Columbus, Ohio.
18. *Analgesia with Nitrous Oxide Gas and Oxygen*—George N. Wasser, Cleveland, Ohio.
19. *High Pressure Anaesthesia*—W. T. Jackman, Cleveland, Ohio.
20. *Porcelain Jacket Crown Technique*—A. L. LeGro, Detroit, Mich.

### AFTERNOON SESSION

1:45 P. M.—Symposium on Infections—Essay—"*Pyorrhea Alveolaris Up to Date*", Dr. Thos. B. Hartzell, Minneapolis, Minn.

Essay—"*Peridental Abscesses Associated With Milkborn Septic Sore Throat*," Dr. Clarence J. Grieves, Baltimore, Md.

Discussed by Dr. Louis W. Ladd, Cleveland, Ohio; Dr. F. H. Skinner, Chicago, Ill.; Dr. Neville S. Hoff, Ann Arbor, Mich.; Dr. M. H. Fletcher, Cincinnati, Ohio.

General Discussion.

### EVENING SESSION

6:00 P. M.—Reception to Guests. (Informal.)

7.00 P. M.—Dinner and "*Health and Science Conference*", President Weston A. Price, Presiding.

Addresses: *Greetings from the National Dental Association*—President Homer C. Brown, Columbus, Ohio.

*The State and Dental Science, How Each Can Help the Other*—Governor James, M. Cox, of Ohio.

*How Dental Infections Reach Other Organs and Tissues*—Dr. Victor C. Vaughn, Dean of the Medical Department, University of Michigan, Ann Arbor, Mich., President Elect of the American Medical Association.

*Exact Knowledge and How It Is Obtained*—Dr. Edward C. Kirk, Philadelphia, Pa., Dean of the Thos. W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, Editor of the *Dental Cosmos.*

*The Relation of Dentistry to the Health of the People*—Dr. E. F. McCampbell, Secretary of the State Board of Health, Columbus, Ohio.

### THURSDAY, DECEMBER 4th, 1913—LAST SESSION

9:00 A. M.—Admission Tickets issued to those who do not attend Wednesday.

9:30 A. M.—Clinics Begin. *On Time.*

The same Clinics will be given as on Wednesday, but no one will be entitled to witness the same ones twice. It is only possible to attend *ten* Clinics on each day. Study the instruction given at the meeting "How to attend the Clinics." The Progressive plan gives the best satisfaction to everyone attending Clinics. All can see and hear. The subjects have been well selected, and every one on the list is a *Star Clinician.*

The Clinics will be *Lecture Clinics* and will be really a Post-Graduate course of instruction. It is necessary to secure your class-letter before the clinics open, otherwise you will lose both time and Clinics.

*Wednesday evening* a conference dinner will take place at the Commerce Club. For this event only 300 tickets can be issued; price per plate, $1.00. The first 300 members to send in their money or checks will be seated. Others who cannot be accommodated will find an excellent restaurant in the same building, where they can be served and then come up to the club rooms and hear the speakers. Send your reservations and remittances to L. L. Barber, Chairman Local Committee, 715 Spitzer, Toledo, Ohio.

Toledo dentists are preparing to give a rousing reception. ON TO TOLEDO.

ARRANGE YOUR DATES NOW!

# THE USE AND DISUSE OF PORCELAIN AS A FILLING MATERIAL*

BY HENRY C. RAYMOND, D.D.S., DETROIT, MICH.

DOUBTLESS MANY MEMBERS of this society, on seeing porcelain selected as a subject for a paper at this meeting, were not over-enthusiastic about that part of the program, and some who are present to hear the paper read are not intensely interested in the procedure. It is solely because there exists that indifference and lack of knowledge among many in the profession regarding this subject that your essayist has been persuaded to take it up. Referring to the title of the paper, "The Use and Disuse of Porcelain As a Filling Material." those of us who are using it, and have been doing so for the past ten years or more, can readily give the reason for its use. It is because we have found it to be one of the most reliable filling materials we have, and because it best meets the requirements for artistic operations. But more will be said later of its use. It is to the disuse of porcelain that attention is first called. From writing on this subject it is not to be inferred that porcelain has fallen into disuse entirely, for such is not the case. It is being used as much, if not more than ever, by those who have become familiar with it and have experienced the satisfaction of the beautiful operations its employment places within their reach. It is to the disuse of porcelain among many who took it up only to discard it as a failure, and to its non-use by the greater part of the profession that our attention is called.

Porcelain was first introduced about twenty-eight years ago, but at that time it was not taken very seriously. There were so many failures, owing to faulty technic, as well as to the want of proper material to work with, that many were discouraged, and for several years it was used only by a few, who steadfastly kept at it in spite of failures. But it was the re-birth of porcelain which occurred about twelve years ago that placed it squarely before us and demanded our attention. By that time reliable furnaces were to be had, improved porcelains came along, with properly prepared platinum, and a technic had been worked out that greatly simplified the work and made it possible to do some very creditable operations.

For a few years papers on porcelain were read and porcelain clinics given at our national, state and local society meetings. A genuine porcelain wave seemed to be passing over the country, and interest seemed to be thoroughly awakened. But interest must be more than awakened. it must be sustained by success to accomplish anything. Many were not successful with porcelain work for various reasons; discouragement followed and its growth and development were retarded. By many, porcelain work has not been even attempted because of the numerous failures which were reported by both operators and patients. But there was good reason for such failures, though they were not thought of or taken into consideration as they should have been. Women are often accused of being illogical, but probably men are equally so in many instances, and here we have a good illustration of it. Many, after hearing a paper read on porcelain, or after seeing a clinic, would at once make the attempt to do the work, and in most cases fail, such failure being put down to the impracticability of porcelain. They seemed to forget that they did not make a perfect gold amalgam, or cement filling from just hearing a few lectures, or seeing a demonstrator at work. Before we could do such operations, we, in most instances, worked outside the mouth on models, and made many fillings in the mouth and had many failures before attaining anything like perfection. It does not seem to have occurred to many when looking at beautiful porcelain operations which from every point of view were a success, that to achieve such results the operators had given much time and patience to mastering the work and acquiring the correct technic, just as they did in perfecting themselves in the use of other filling materials. Of course, they had their failures, as we all do, when attempting anything worth while; but those men who have been successful in this work have first mastered it as they have anything else that they have succeeded in. Porcelain work has not been taught in the colleges as it should have been. In some colleges it is barely touched, and when it is included in the curriculum it rarely receives the attention that do the other subjects. If it were rated of as much importance as gold filling and taught as thoroughly there would probably be little to say on the disuse of porcelain.

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*Read before the Michigan State Dental Society, 1913.

Most of us who are doing this work learned nothing about it in college and so have had to learn from one another and by experience, but all who have succeeded have done so only by patiently and perseveringly working out the problems for themselves, not by just seeing another man do it. Many have not taken up porcelain, and others, having taken it up, have not persevered with it, owing to the attitude of some prominent men in the profession regarding it. This stand was honestly taken by some who could not see anything that could take the place of gold as a filling material, who did not and do not believe in porcelain, principally because they had never used it. Others have in a mild way condemned it, because they had never tried it and had not the energy or inclination to take up anything new that did not look easy. Others again admitted it might have its place, but offered so many objections to its use that many were deterred from attempting it, and many others have been discouraged from continuing its use. All this has had its effect, for the older and prominent men in a profession must, and in a measure do, influence a great number. But while these men merit our respect and consideration, there is no reason why we should blindly follow every edict that is put forth.

The dental profession is a comparatively new one, and the rapid progress being made precludes any of us from accepting anything as final. The late Colonel Ingersoll used to say in an introduction to one of his lectures: "Let the little lamp of reason burn." If we do that we will each one think and act for himself, and that is what we must do to go forward. There probably has been nothing new of importance introduced into the dental or medical profession that has not been more or less condemned.

When that faithful old servant amalgam was first introduced, and for many years afterwards, it was abused and rated as one of the blackest and most unreliable rascals it was possible to plug a cavity with, but many who were its bitterest enemies became its greatest friends; and that, in spite of the fact that no material we have ever used has been so maltreated. It today is one of the greatest friends we have. This is simply mentioned as one of many illustrations which might be given, but it goes to show that each one must think and act for himself, for the knowledge gained from experience is the only thing that really counts.

Nothing has proved that more forcibly than the advent of the silicate cements which have been introduced, one after another, as a panacea for all our troubles in filling teeth. With some (especially the makers) they were going to take the place of everything, but especially were they going to replace porcelain. Those of us who have thought for ourselves and gained our knowledge from painstaking experience know to what extent these promises have been fulfilled. There has been nothing so far given to us in these silicates that can fill the place of porcelain, excepting in a minor degree, as all who have faithfully worked with the two materials can testify.

There is little doubt, however, that the introduction of these cements, with all that was promised with them, has been an important factor in retarding the growth and development of porcelain work, for with the rosy and glowing accounts of all they would accomplish there was one feature that stood out strongly before very many, viz., it looked easy. It was the apparent ease with which these cements could be used, with results surpassing that of porcelain (according to the manufacturers) that attracted so many to their use, and here is where human nature shows itself to almost a degree of comedy.

The warning cry uttered against the use of porcelain, the mastery of which cannot be considered exactly easy, was quickly heeded; but the even stronger outcry and warning regarding the silicate cements, which promised ease in operation, fell on barren ground. They offered a maximum result with a minimum effort, and that appeal has been too strong to be resisted, so many who were using porcelain with not always the best results discarded it for something that looked simple, and many more who might have taken it up were attracted to the silicates for the same reason.

The last, but not by any means the lightest, blow to the advancement of porcelain work, was the introduction of the cast gold inlay. Here was a method that promised definite results with a minimum amount of work. The seeming ease with which the work could be done was a great attraction and resulted in its being taken up to an extent that has almost amounted to overdoing it. Now, this is not to be considered in any sense a disparagement of the cast gold filling, for the writer uses it, and has done so from its introduction. It is probably the greatest thing ever given to the dental profession, and it is to be greatly regretted that just recognition has not been given to Dr. Taggart for inventing and developing this wonderful process. Nevertheless the perfecting of the casting of gold has affected the advancement of the porcelain filling. It is easier to do and in some places is to be preferred to porcelain, so is used frequently where the latter was formerly employed. But, like many other good things, it is abused and used in many instances where the use of porcelain is strongly indicated. Possessing all the merits that it undoubtedly has, it is not indicated everywhere, and it certainly does not and cannot take the place of porcelain in very many cases. Quite a number who discarded and condemned porcelain because of the cement line seem to have forgotten about that, judging from the number of cast gold fillings that are being put in. That is probably because most of them are put in the posterior teeth, where poor margins are not in view, and so faulty work is kept well out of sight. And the same men who discarded or condemned without a trial the porcelain fillings on the ground that they would not stay in place, or that caries would follow from the washing away of the cement if they did stay in, are using almost exclusively the gold inlay, though the same objection may be applied to it as to the porcelain.

Such a stand is hardly consistent and can only be accounted for because of the difficulties that the mastery of porcelain seems to present; while the gold inlay seems to be easy. As a matter of fact the making of a cast gold inlay seems to have appeared to many so simple that time or care has not been given to acquiring the technic to make good operations, and as a consequence there are all over the country countless gold inlays with gaping margins and broad cement lines, as pronounced as any porcelain fillings ever showed, but as before stated, most of them are well out of sight. It may be mentioned that the cast gold inlay has not escaped criticism and condemnation by a number of men who do not believe in any cemented fillings, but that stand has not affected to any extent the almost universal taking up of the work.

The foregoing statements have been made in an attempt to show why the disuse of porcelain. They are given as a reply to the not infrequent queries, such as: "Isn't porcelain going out or being very little used?" or "Isn't the gold inlay going to take its place?" They are given as a reason for the apparent disuse of porcelain.

The remaining portion of the paper will be briefly devoted to the use of porcelain as a filling material. Not as a defense for its use, for it needs no defense, as all who are its advocates, as well as their patients, can ably testify. There have been and are failures with this work, but the same is true of other filling materials, which have not been discarded on that account. On the contrary, painstaking operators have benefited from their failures and mastered their material. Porcelain workers have accomplished the same thing by keeping at it, and overcoming the difficulties it seemed to present. Their experience has shown that teeth can be preserved with porcelain as well as with any material we have, with the added advantage that it so closely resembles nature that the casual observer fails to see where art has taken its place. It is the being able to match in color and texture the natural teeth so closely that places porcelain so strongly in the foreground. Even if it were not so good a tooth preserver as some other materials, this feature which enables us to get away from the unsightly gold would alone strongly commend it to us as something not to be entirely discarded. But when it has been demonstrated, as it undoubtedly has, that as a conserver of the teeth it is surpassed by nothing else, and indeed hardly equaled, does it not seem that it should have our earnest consideration? Most of the failures in the early days of the work were the result of faulty cavity preparation, which would bring disaster to any filling material. Some teachers laid too much stress on the holding powers of the cement. It was always a difficult matter, too, to burnish a perfect matrix in the mouth, and without a perfect matrix it is impossible to make an inlay that fits correctly. With such faulty and uncertain methods as were for a time in vogue it is not to be wondered at that many fillings came out, and many that remained in place soon showed a dark line where the excess of cement had dissolved away.

The foundation for success with any filling material rests on correct cavity formation. This might almost be considered an axiom, and applies with special force to the cemented fillings or inlays. Most of the failures in porcelain work have resulted from a disregard of this principle, and this was specially so in its early days. Some prominent porcelain workers were in a measure responsible for this, as from their teaching it was inferred that the cement would retain the inlays in place, even in saucer-shaped cavities, so little attention was given to cavity form as long as the margins were sharp and even. With such disregard for mechanical principles it is not to be wondered at that many fillings came out, especially those in the hands of some who were not expert in getting a perfect matrix; for a combination of incorrect cavity preparation with a faulty matrix is bound to result in failure.

It is not the intention to go fully into the subject of cavity preparation in all its various forms, but to try and call attention to certain principles which must be followed. The cavity must be formed so as to give as definite a seat for the filling as possible. The direction of the forces to which the filling will be subjected must be considered and care taken to so shape the cavity that the inlay may from its retentive or interlocking form overcome such forces. Parallel walls are to be avoided, and all frail enamel margins, as well as enamel unsupported by sound dentine, must be removed. The walls must diverge slightly towards the margins, which must not be beveled, but finished to a perfectly square or knife edge and made as smooth as it is possible to finish such margins. Without a perfect margin it is impossible to have an invisible line of cement. It must also be remembered that porcelain is a friable material, and if the cavity is not prepared so as to allow strong margins to the filling, failure will occur, which is likely to be attributed to the weakness of the material used instead of to faulty cavity preparation. Cavities on labial surfaces should be prepared so as to give the inlay a uniform depth and as deep as may be permitted to overcome the tendency of the cement to change the shade of the porcelain. It is of the greatest importance that ample space be obtained before attempting work on the approximal surfaces. Many failures in porcelain work come from not realizing this.

The late Dr. J. Q. Byram published a very concise work, entitled "The Principles and Practice of Filling Teeth with Porcelain," in which the subject of cavity preparation is fully gone into, with illustrations. In a few cases the cavity preparation advocated is probably a little more complicated than is necessary, but the broad, general principles essential for success are ably treated and presented. The next step is the burnishing of the matrix, and here is where many of us have fallen down. The difficulty in the first place has been to burnish a perfect matrix in the mouth and remove it without changing its form, especially in inaccessible places, and when succeeding in getting a good matrix, it has been difficult to prevent distortion in handling and from shrinkage of the fusing porcelain. If we do not get a perfect matrix and use some means to keep it so during the process of making the inlay the result cannot be satisfactory in any case, and in many instances it will be a total failure.

With the method used by the writer and by some others, it is not only possible but generally comparatively easy to produce a matrix that fits the cavity, by burnishing it out of the mouth on a metal model made from an impression taken with Perfection Modeling Compound. It is not necessary to give particulars regarding this work, as Dr. E. B. Spalding, of Detroit, has given several clinics, very fully demonstrating the method of making both porcelain and gold inlays on amalgam models. The writer for several years burnished all matrices in the mouth, and believed it the more reliable method, after trying to make cement and other models from impressions with dental lac, etc. There are some who yet practice the direct burnishing of the matrix and believe it to be the better method, but it hardly seems possible that anyone who has mastered the simple technic of the model method can fail to be convinced of its advantages.

It not only simplifies the work for the operator in many ways, but it is much easier for the patient, for the burnishing of the matrix in the mouth is not always a pleasant operation, especially when the cavity extends beneath the gum margin. Working on a model the matrix can be more readily adapted, as it is easy to approach the cavity from all directions; then, too, it is a simple matter to burnish a second matrix if desired, or make two or more inlays as is occasionally necessary, thus rendering simple a proceeding that would not be so with the direct burnishing. Those who are interested in the impression method are referred to an excellent article on that subject in the February DENTAL SUMMARY by Dr. Henry W. Gillette, of New York, and another article in the same journal by Dr. H. W. Arthur, of Pittsburgh.

As before stated, many misfits in porcelain work are the result of faulty manipulation of the matrix and the changes it is subject to during the different stages of the work.

These troubles come primarily from using too small a piece of platinum, which is unavoidable in most cases when burnishing in the mouth. By using a properly made model the matrix can be removed with the positive knowledge that it has not changed form, so there is one difficulty overcome. Then the use of the model permits of using as large a piece of platinum as is necessary to overcome possible distortion while building in the inlay, and the warping from the shrinkage of the fusing porcelain. With our large piece of platinum the generous apron extending from the margin of the cavity can be turned over to several folds, thus forming a ring of stiffened metal, which, together with the bulk of material seems to entirely overcome the shrinkage of the porcelain in all fillings excepting the large compound ones, which generally require a second matrix. The stiffened margin given to the matrix also renders it easy to handle without fear of distortion. It is realized that many of the failures in porcelain must be attributed to the incorrect manipulation of the matrix. If that can be overcome, one of the great difficulties will be removed.

It is not the intention to attempt a treatise on the different steps in filling teeth with porcelain, so only a few governing principles will be mentioned regarding the building up of the inlay, the baking, and the blending of colors. Much has been written on the subject and it is ably treated in the work by Dr. Byram, before referred to. Each one must by experience and a trained eye master the blending colors for himself. It can only be partially taught, but it may be acquired by patient effort to a very satisfactory degree. The success attained depends largely on the ability to detect the different colors and shades of colors in the natural teeth as well as in the porcelains which are being used. The colors in some teeth are easily matched and the porcelain blends in perfectly, while others are difficult to match, and the inexperienced are often discouraged, but it is surprising how many difficulties may be overcome by persevering, and in many instances what beautiful results can be obtained.

The manner of building up and baking the porcelain is important. The amount of shrinkage is in a measure governed by the consistency of the mix, so it is advisable to avoid thin mixtures and to have the mass of as putty-like consistency as can be worked, excepting in the final layers. If the first layer or foundation (which should always be a body of a higher fusing point than the finishing layers) is a coarsely ground porcelain, the amount of shrinkage will be reduced, as coarsely ground porcelains shrink less than the finely ground ones.

The proper baking of the porcelain should not be a difficult matter with the reliable furnaces and pyrometers now furnished, yet there are points in connection with this part of the work which it is well to bear in mind. The over-fusing of porcelain weakens it and renders it more brittle, and is likely to burn out the colors. Porcelain that is not baked too quickly is more homogeneous, retains its characteristic colors and is less brittle than is porcelain quickly baked at a higher temperature. Large masses of porcelain require a longer time for fusing than do the smaller ones. To avoid over-fusing a filling, it should be brought to the full fusing point only when the final layer is put on. In all previous bakings it should be slightly underfused. Proper care in baking is of the greatest importance to give to the porcelain its maximum density and strength as well as to retain its color.

The cementing in place of the filling requires nice care and correct manipulation of the cement used, which should be one having a finely ground powder, so that there may be a minimum amount of cement between tooth substance and filling. It sometimes happens that a filling which is a perfect fit is not a success, because it has not been carried home, or definitely to its position. This leaves a surplus of cement at the margin, which in time washes out, leaving a space, and is the cause of the dark line so often mentioned. Failure to carry an inlay to position may come from too thick a mix of cement, or from the cement setting too quickly, owing to high temperatures or other causes. Incorrect cavity formation may be the cause of imperfect seating of the filling, from having too many angles or from walls that are almost parallel, instead of converging towards the pulpal wall, as they should. This causes the cement to pack instead of flowing out, as it must do for the definite seating of the filling. All that is to be gained from getting and retaining a perfect matrix will be lost if the finished inlay is not properly cemented into position, so it can be seen that this forms a very important part of the operation, and great care should be exercised in its performance.

The limitations of the use of porcelain as a filling material have been used by some as an argument against it, but everything we use has its limitations. A physician might, with just as much reason, eliminate some useful drug from his practice because its field of usefulness is limited.

As a matter of fact the field for the use of porcelain is not more limited than is that of other filling materials, if as much. It is true there are places where its use should not be attempted, but failures resulting from its misuse are no argument against it any more than are those due to faulty manipulation. The use of porcelain is indicated with few exceptions for the incisors and cuspids and, probably, everything considered, is the best material at present known for those teeth. Its use is also indicated on the buccal surfaces of the bicuspids and generally in the mesio-occlusal surfaces as well. It may be used in the mesio-occlusal surfaces of the first molars under certain conditions, where they are conspicuous and the display of gold would be unsightly. It may be used in the anterior teeth, where the enamel margins are not as strong as might be desirable, if only for its esthetic effect, for the use of gold in those teeth is seldom warranted, and is daily being more strongly objected to by our patients. Its use should never be attempted in occluso-approximal surfaces or on the occlusal surfaces of the bicuspids and molars where the walls are thin and the margins frail, for a chipping of the margins is almost sure to occur and frequently a breaking down of the weak walls as well. Where, however, the walls are strong enough in themselves to stand against the force of mastication, and the cavities are prepared in such a manner as to allow strong walls of porcelain without any frail margins, it may be used in those places with little fear of failure.

Practicable and very beautiful operations in porcelain may be made on the bicuspids and molars where the entire third or more of the tooth has to be replaced, if the bite permits sufficient bulk of porcelain to withstand the encountered forces. In this way many teeth that would otherwise have to be crowned may be preserved with inlays, restoring them to full contour, with the gingiva kept free from any irritation, something which it is not easy to accomplish when using a crown.

In the application of porcelain a knowledge of its properties as well as of the principles of inlay work are essential. Its limitations must be taken into account, for it has been the injudicious use of it, sometimes from over-enthusiasm, as well as from ignorance, that has caused many of our failures. The material itself has been and is blamed frequently for such failures, whereas it has been the workman who has been at fault and not the material.

Porcelain properly employed is one of the most reliable filling materials available. It is beautifully clean, for though it has not in itself any hygienic qualities, its use is an aid in helping to maintain a hygienic condition, for its glazed, smooth surface is as easy to keep clean and free from deposits as is the most highly polished enamel of the natural teeth, something that cannot be said of anything else we use. While it is true that its mastery requires a little more technical training and patience than does anything else, the results to be obtained will more than compensate those who undertake it, and there is no reason why a large majority of the profession should not be able to employ it in some of the simpler cases at least. People know what it is and many know what can be accomplished with it and demand it. It is the duty of every dentist to equip himself to meet the demand, or at any rate to recognize where its use is indicated, so that if he cannot render the required service he may be able to refer the patient to some one who can. The time has passed when men who do not do the work or know little or nothing about it, can put patients off by saying it is not practicable. People know that it is practicable just the same as they are learning the value of oral prophylaxis and demanding it, and it will best serve the interests of both the patient and operator to be honest and not condemn something of which one has little or no knowledge. Instead of porcelain being used less than it has been, it is going to be used more, and the indiscriminate use of other methods and materials is helping to bring this about.

The history of porcelain of the past dozen years in the hands of those proficient in its use, demonstrates that in it we have a filling material that is one of the best conservers of tooth substance at present known. That, together with its esthetic qualities, must make for success, and its future will not be one of retrogression, but one of progress. In striving for the ideal results it is possible to obtain with this work, our artistic side is brought out or developed, as well as our skill and patience, and the man who becomes a proficient porcelain worker will find that in doing so he has become a more careful and better all-around operator. As the knowledge of porcelain and its use increases, and it is realized what can be accomplished with it, less will be heard about its disuse, but instead, as we develop its possibilities and learn its true value, we will hear more rather about its use.

## DISCUSSION

Dr. C. J. Lyons, Jackson, Mich.: I want to congratulate Dr. Raymond on his paper. I think it is particularly timely at this time, when porcelain is coming into its own. There are just three things that enter into the use of porcelain as a filling material:

*First.* Thorough knowledge of the technic.

*Second.* Judicious application.

*Third.* Close attention to details.

Now, if we follow out these principles, we cannot fail. The man who condemns porcelain as a material should condemn his ability to use it rather than the material.

I believe that there are two factors that have entered into the disuse of porcelain more than anything else. One is the very enthusiastic man who advocated the placing of porcelain in any part of the mouth. In fact, it has been stated by some good porcelain operators that porcelain could be placed any place in the mouth, it simply depending on the ability of the operator. Such statements have caused a great deal of harm, especially to the younger men just beginning in practice.

Another factor entering into the failure of porcelain has come from the manufacturers of the porcelain bodies. The manufacturers place 20 or 30 different shades of porcelain on the market and expect the amateur in the use of porcelain to take these shades and reproduce the color of the tooth. I believe if we take Sir

David Brewster's theory on colors, we can produce any color in the mouth; that is, by the combination of the primary and secondary colors. I believe we can take the yellow, grey, white, brown and blue and duplicate any shade in the natural tooth. I believe that many of the amateurs in taking up porcelain work have become confounded with the problem of the color scheme. After the inlay is completed, they will be very much disappointed in the color, on account of the complex problems of the color scheme in attempting to use so many shades.

I believe if we are trying to do the best work possible for our patient, time and expense should not be a factor, and we all have in our practice patients who appreciate our work and will not want us to take into consideration time and expense if we expect to accomplish the most good for them.

It is not a matter of taking a shade guide and getting your color for your inlay and then taking it to the laboratory. There are a whole lot of things that have to be taken into consideration besides the color of the shade and the guide.

If we take a shade guide and place it before the tooth we may have the shade of the tooth, but the minute you place the finished inlay into the cavity your whole color may be changed. There is where cavity preparation must come in. We must have the contour of the tooth—we must have that inlay built as nearly as possible of density of the tooth in order that the diffusion and refraction of light may be equalized.

EDWARD B. SPALDING, Detroit: If the essayist has any idea that I am going to take exception to his paper, he is mistaken, for I heartily approve of all he has said.

Dr. Raymond is very opportune in bringing porcelain as a filling material to our attention so forcibly and clearly at this time, when interest in the subject is beginning to be awakened again. I say *awakened*, for I think the majority of the profession think of porcelain rather as a dream than a reality.

But there is sure to be a return of interest in the subject, because where there is merit it will survive prejudice. Dr. Raymond has assured us and given us good argument that porcelain has merit, and if we could talk with his patients who have for ten years been receiving his excellent services in porcelain inlays they would also tell us that we could not offer them gold or any other material as a substitute for them when porcelain is indicated.

The tide of progress cannot be stemmed, and while we may be satisfied with a condition as long as we think there is nothing better, when we learn of or experience a more desirable state of things, we are not satisfied to return to the old. So a patient who has experienced the satisfaction arising from good porcelain work will not submit to displaying large masses of gold in his anterior teeth.

One of the reasons for not using porcelain given by some operators who have never departed from gold as their most artistic filling material, and by some who have attempted porcelain inlays and for lack of correct technic have failed, is, that it is not permanent. Permanency is a relative term especially when applied to operations on the teeth. I have in mind at this moment a malleted gold filling put into a cuspid by one considered to be a first-class gold operator which failed before two years had elapsed, and a porcelain inlay put in its place which has been in use over four years and which shows no signs of failing at present: and another instance of a gold filling in a molar which failed before two years and was refilled by a gold inlay which has been serving over four years. In these two instances, at least, the inlay should be considered more permanent than the malleted filling, but of course the reverse may be true in some other instances. Permanency depends upon the man, the method, the material and the mouth.

We all know that an operation which would make a relatively permanent filling in one mouth would not do so in another.

Why should a dentist who, when he was in college and was required to insert at least a hundred gold fillings which were inspected by the demonstrator, and after graduation has practiced several years and then makes some failures of gold fillings; why, I say, should he, as Dr. Raymond has said, after hearing a paper and seeing a clinic on porcelain inlays, expect to go home and make permanent inlays? Simply because we are inconsistent. That is the greatest reason why porcelain has fallen into disuse.

There is a price to pay for everything in this world, and those operators who are using porcelain successfully have purchased their ability by years of hard work and patient attention to detail. Another reason that porcelain has fallen into disuse is the matter of time and energy necessary by even the most skillful operators to produce a good porcelain inlay. It takes more time to prepare a cavity properly for an inlay than for other fillings. The burnishing of the matrix in the mouth takes time and patience, but now that the impression and model method is being learned, the forming of the matrix is easier for both operator and patient and usually more accurate.

The baking of the porcelain is a careful and slow procedure also, so that from the preparation of the cavity to the setting of a porcelain inlay is a chain of careful, time-consuming steps, any one of which may be an imperfect link. When we take into account all this we must demand a suitable fee if we are to make a living. Here is the stumbling block for many, and why they have discontinued the use of porcelain: They have been afraid to say to their patient, ''This will take very much more of my time and I shall have to charge you accordingly.'' Rather than be strictly honest, it is easier to put in a silicate cement and call it porcelain. I will venture to say that the percentage of failures in the use of silicate cements is as great, if not greater, than that of porcelain has ever been. One thing certain, it is the very rare exception that a pulp becomes devitalized under porcelain while under silicate cement, especially of a certain make, the death-knell is very frequently sounded. The gum tissue about a silicate cement filling is almost never without more or less show of irritation, while a properly fused porcelain inlay will not retain irritating deposits.

To imitate the natural teeth in minute detail in porcelain, either inlays or crowns, is an art of a high order; and the poet's words that ''art is long and time is fleeting'' is just as applicable to porcelain as to canvas or marble. It necessarily is confined to the few and not the many patients on account of the greater fee necessary to pay us for our time and effort. When this is realized and emphasized by the operator and learned by the laity, there will be more and better porcelain work done.

The burnishing of the matrix and the importance of careful handling of it is emphasized by the essayist. Each operator has his particular ideas on the obtaining and handling of the matrix, but the perfected result is the important thing.

Dr. E. A. Honey, Kalamazoo: The essayist has given us a paper of great value, both by way of suggestion and instruction. This was to be expected. He has appeared before this body many times, both in papers and clinics, and has always brought us something that has been the direct result of conscientious, painstaking and intelligent work. It would be difficult to find words to suitably express my respect for the influence this gentleman has had in establishing high standards in dentistry, especially in the branch of porcelain.

To only such portions of this paper as relate to the non-use or abandoning of porcelain as a filling material will I direct my discussion. There is no doubt that at least a very large percentage of those who have either abandoned or partially abandoned the use of porcelain as a filling material have done so for reasons good and sufficient, at least from their standpoint, and the essayist has for the most part enumerated those reasons, at least as they appear to him. However, should we select at random twenty operators and allow each in turn to state his reasons for his partial or complete disuse of porcelain, it would bring forth twenty different replies, There is no doubt in my mind that a great deal of the disuse of porcelain has come about through faulty teaching relative to cavity preparation during the period when enthusiasm ran high. Many dentists began the work believing that inlays would remain indefinitely in cavities that fairly defied all the laws of mechanics. The results of this faulty teaching are familiar to you all.

Then, again, I think most all porcelain operators will admit that after a few short years a large percentage of porcelain inlays were a disappointment to the patient and the operator alike. I refer now to such inlays as remained intact and succeeded in protecting the tooth against further decay; the discoloration of the entire inlay in very many cases and the general development of the brown line at the margin of the porcelain in a still larger number of cases. These were features of disappointment that seemed to be under the control of the operator, to only a very limited degree at least, for we have found these conditions existing where our most skillful men had operated, and they have by no means been confined to the product of the rank and file of the dentists who made no claim to special skill.

The essayist has referred to the advent of the cast gold inlay, and pertinently so, as one cause for the reduction in the use of porcelain. To my mind this is one of the most important factors in the substitution of gold for porcelain. The same care taken in constructing a gold inlay will produce a result better in a general way where cutting or occlusal strain has to be taken into account.

The opportunity for burnishing the inlay margins, especially where the indirect method is used, makes possible operations which, for the most part, eliminate the cement line. There are many cases even in the anterior teeth on surfaces not in the line of vision where the cavity is shallow and occlusion heavy that would be better filled with the gold inlay than a porcelain, if an inlay at all is to be used. It is not my experience that the gold inlay is a saving of time over porcelain, for the reason that a great deal of time is consumed in burnishing and the final polish.

The silicate cements referred to by the essayist have doubtless been responsible for a great reduction in the use of porcelain. To quite an extent they have been a disappointment, but there seems to be little doubt now that we will soon have silicates which will prove a very satisfactory filling material for many of the small cavities in the anterior teeth, and to that extent will the use of porcelain be affected.

The saving of time to the operator and expense to the patient are factors that must receive consideration by the conscientious dentist. For the larger cavities in the anterior teeth and in all cases where the incisal angle is to be restored and the length of bite will permit porcelain is clearly indicated, but large restoration in porcelain in molars and bicuspids will for the most part come from the hands of the porcelain enthusiast.

I find in some cases that the dentists have discontinued the use of porcelain and have returned to the malleted gold filling for the reason that they felt surer of their result in an operation with which they were familiar.

Some dentists have stated that they were obliged to abandon porcelain for the reason that they were unable to get a fee in keeping with the time and skill used, while others simply are too busy making money from the ordinary operations in gold and amalgam to give time to the mastering of the technic. This undoubtedly applies to a large percentage of the busy men now making little or no use of the porcelain inlay.

The fact yet remains that very many of us have avoided the use of porcelain where possible from sheer laziness; we shrink from the operations because they call for a great deal of patient and persistent effort; many failures must be encountered, and much time must be spent, apparently without financial reward, before we are in a position to offer our patients something worth while. It is for this reason that I consider the paper a very timely one. Many of us have drifted away from a very important factor in dentistry. We cannot all be specialists in this line of work, but many of us, by patience and persistence, may attain a fair degree of skill and thereby reflect credit on ourselves and the profession at large. It is clearly our duty to develop such a degree of judgment as will enable us to decide what material shall be used in making a restoration in any given case. And if we have not the skill necessary in handling this material, it is plainly our duty to develop it, and the majority of us can do so if we would.

Dr. A. L. LeGro, Detroit: It has given me great pleasure tonight to listen to this paper on porcelain and also the discussion. I have been interested deeply for several years in the porcelain inlay proposition, and I do not know of any one more capable of telling us of the use and disuse of porcelain as a filling material than Dr. Raymond, and I know of no two men better able to discuss that paper than Drs. Spalding and Honey. Porcelain, to my mind, is the best filling material we have, where indicated. Not alone because of its cosmetic value, but its non-conducting quality and ability to keep free from all starchy deposits of foods are qualities greatly in favor of its adoption wherever possible. Porcelain has no especial preserving qualities, but in conjunction with the cement that is necessary to keep the filling seated, it is an ideal combination. Many years ago dentists discovered that cement was an ideal substance to arrest and prevent recurrence of decay in the teeth. The fact that this material was of a decided temporary nature in most mouths precluded the possibility of its serious consideration in permanent work until the value of the inlay method of filling teeth made it possible to permanently retain the good qualities of cement as a preservative, practically indefinitely in the mouth.

However, with the advent of the porcelain inlay came the very great problem of refraction and the absorption of the lights by the cement. We all know that cement absorbs light absolutely. The cavity preparation for porcelain inlays must therefore be executed with the idea of having the rays of light penetrate entirely through the largest diameter of the filling. If this precaution is not kept in mind, all the colors in Christendom will not help the operator out of the dilemma he will be in, for the filling, after being placed with cement, will be found dark and decidedly off-color, and the beauty of the work lost entirely, even though it was a perfect match before the setting.

Take a proximal cavity in any of the six anterior teeth involving the linguo-approximal angle but not coming over onto the labial side of tooth. If an attempt is made to bring the border just to or slightly involving the labio-approximal angle, the cement in the finished case will have absorbed the light and a dark inlay results, even though opaque white is used as the color of porcelain. That labial side of the cavity must be cut away sufficiently to allow the rays of light to penetrate and go clear through the porcelain without plunging into a wall of cement when it gets on the other side.

Dr. Raymond's paper dwells to some extent upon the disuse of porcelain. So far as discrimination in selecting cavities for this work it seems to me that he shows no partiality, but in practice puts them everywhere and in cavities from the size and nature of which the ordinary operator would declare they were not indicated. They are both beautiful and practical. Practical when used in molars and bicuspids especially where bulk can be obtained and attention is religiously paid to restoration of marginal ridge and at least an attempt at restoration of sulci and general characteristics.

The laboratory bid for work of this nature can only appeal to men who have no possible conception of the details that go to make up a good porcelain inlay. Sending work of this nature to a laboratory is ridiculous and can only result in indifferent work. An operator who really understands and appreciates what is necessary in the correct preparation of cavity and borders for porcelain inlays and can successfully practice what he knows, is never going to send out a C. Q. D. message for help from such a source as suggested by our laboratory friend tonight.

**Dr. A. C. Thompson**, Port Huron: I want to say that I have listened with a great deal of profit and pleasure to Dr. Raymond's able paper and to the discussion that has followed. A few weeks ago I asked a prominent dental educator how the use of the porcelain inlay was progressing, and he said, "Hush! not so loud in the presence of the dead!" I am glad it is being revived. I have been using porcelain for some seven years with varying success, and have come to the conclusion that there are times and places where we must use it if we do our patients justice. Particularly is this true in lateral and central incisors, where large gold restorations would be unsightly. Here there is no substitute for porcelain and we should familiarize ourselves with its use, and if we do not we owe it to our patients to recommend to them some one who can do it.

The greatest impression I have had in this work was when I attended my first dental convention here in Grand Rapids some years ago, when Dr. Reaves, of Chicago, inserted a beautiful porcelain inlay at our clinic. I made up my mind then that what an expert could do, a man fresh from college ought to attempt, and with patient practice could accomplish. I am practicing in a small city where the demand is not great, but is greater than one can supply. The people are ready for it if we will give it to them. It is up to us.

**Dr. Henry C. Raymond** (closing): There is very little I can say further than what has already been said in the paper.

Regarding what Dr. Honey said about many fillings, put in by expert porcelain workers, showing the dark line around them—that is true, but in the majority of such cases the inlays are not perfectly adapted, owing to faulty matrices to begin with, or to their change in form during the different steps in the work. However skillful one may be in this work, he will have many failures, if he uses the direct burnishing method, for reasons already stated.

In connection with these dark lines, it must be also remembered that there are some mouths which it seems almost impossible to keep clean, which show dark spots or lines on any tooth surface that is at all rough or uneven.

When more is known regarding abnormal mouth conditions, what causes them, and how to correct them, I think that will be overcome. As before stated, there have been many failures in this work, but they come principally from faulty manipulation and not from the material itself. The porcelain fillings some are putting in today are very different from those done a few years ago, and the many beautiful results we are getting foretell a bright future for the work.

I wish to thank those gentlemen who discussed the paper for the very kind things they said, and I thank you all very much for your attention and interest.

## ERRATA

In the article by Dr. Hopkinson in October number of The Dental Summary a few errors crept in as follows: On page 766, 18th line from top the word "squabbles" should read "qualms"; in the 20th line the "s" in "hygienes" should be omitted: in line 23 substitute "deny" for "decry," and "for" for "of." Page 770, 23d line, remove quotation marks thereon. Page 771, 22d line, "conservatively" should read "concurrently."

# THE CONDYLEOMETER

BY W. WARRINGTON EVANS, M.D., D.D.S., HAMILTON, VA.

THE WRITER ADMITS taking very little interest in the so-called Anatomical Articulators and the movements of the condyle path, until he read the interesting articles in the *Dental Cosmos* of 1910, by Dr. A. Gysi, of Switzerland. After thoroughly absorbing the matter, and finding so much valuable food for thought, he determined to study the subject and reduce it to practical utility and see what additional improvements were possible.

The first point taken up was the production of an articulator that would, without complication, reproduce all the essential movements of the mandible, not only as to the registration of the degrees of the condyle path, but the exact distance between the condyles from center to center of each individual case, so that the articulator could work from true pivotal centers, and the like. This has been satisfactorily accomplished.

The next point of consideration was the construction of an appliance that would take from the human jaw an exact record of every movement of the mandible in each individual case and transfer them to an articulator capable of reproducing them. Otherwise the whole subject would be useless, and the old, obsolete, antiquated 50-cent articulator would do as well as any other. To produce a commercial article, the inventor, after crystalizing his ideas, should set his individual likes and dislikes to one side, and consider how the other fellow, especially the freshman, would view it or understand its movements. We are not all endowed with mechanical minds to quickly grasp the ideas of others, and it therefore becomes necessary that we simplify and adjust so as to meet the requirements of the masses.

It is unnecessary to go into the scientific characteristic movements of the mandible in a theoretical sense, as the subject has been most carefully threshed out by such men as Bonwill, Luce, Walker and Gysi. The object desired for the public good is to gather together such data as may be used in an unbiased way to construct an appliance that will meet the needs of the profession.

After measuring the heads of the condyles transversely from a number of mandibles at the government museum in Washington, it was learned that an average diameter was about twenty millimeters (they varied from 17 to 23 mm). The object of this investigation will appear later on.

Figs. 1 and 2 are perspective views of what may be called a "condyleometer." It is in two parts. The upper (Fig. 1) is for the purpose of supporting two protractors, one on each side, in such a way as to bring the centers of these protractors exactly over the heads of the condyles on either side of the face, the framework being so constructed as to make it adjustable to each individual case and side, no matter what the variance. These protractors will enable one to get an exact and immediate record of the movements of each of the condyles in degrees, as will be shown later.

The lower section (Fig. 2) is made up of a graduated bar, millimeters on one side and standard measure—divided into thirty seconds—on the other, with adjustable arms at the end, one rigidly secured at the end of the bar starting the graduation—the other adjustably sliding upon the bar while in the center is an adjustably sliding block supporting another block by a hinge joint. This hinge joint resting loosely upon the top edge of the bar, which is slightly concave, can be locked at any angle when

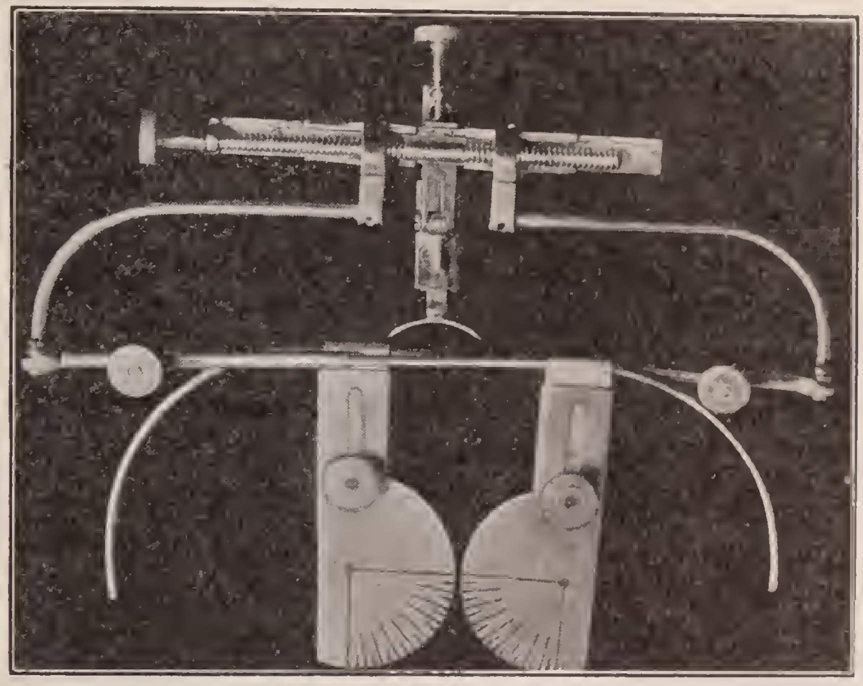

Fig. 1.

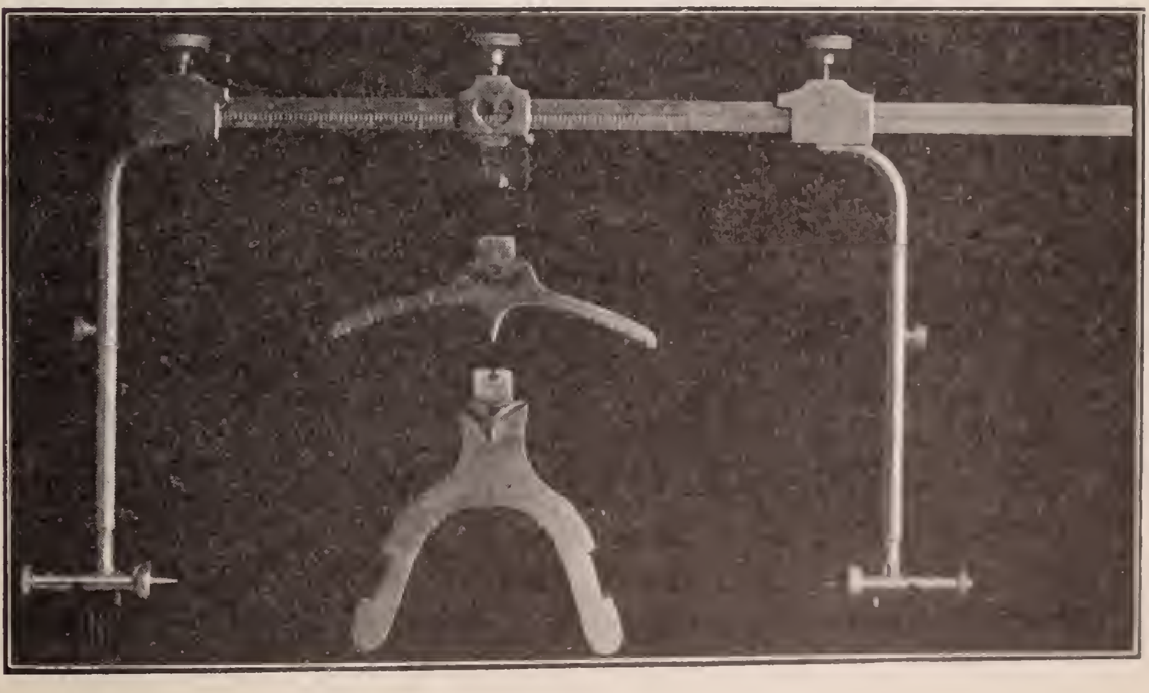

Fig. 2.

pressure is brought to bear by the thumb screw at bottom of sliding block—both being locked at the same time. The arms are adjustable lengthwise, to meet the individual case. At the upper end of each arm is a cylindrical box—at right angles with the arm—with a saucer-shaped head at the inner end, so constructed as to make it adjustable to most of the modern articulators. A small shaft runs through the box, having a coil spring back of it to cause tension upon the point of the shaft when brought into contact with the protractor plates. These points can be drawn back and locked when this part of the apparatus is used only for measuring the distance between the condyles and locating the distance of the bite plates for transferring to articulator.

The block at the starting end of the graduated bar, carrying the vertical arm, is rigidly secured to the bar at a point that will bring the face of the concave head of the cross-section at upper end of the arm, to be exactly thirteen millimeters from the starting point of the graduated bar, if a right angle triangle were placed on the top edge of the bar at O of the bar, while the sliding block at the other end is so gauged that the square placed on the bar at the front edge or face of the block, will also measure exactly thirteen millimeters to the face of the concave head of the cross-section on the end of the vertical arm attached to this block. When in use the concave head of the rigidly secured arm is placed against the face of the patient opposite the condyle on one side, and the sliding block on the other end of the bar is pushed up until the concave head of the arm rests against the opposite side when the block is locked by the set-screw underneath. This will give you the distance from the center of one condyle to the center of the opposite condyle, as shown on the graduated bar at front edge of sliding block. As mentioned before, the average measurement of the head of the condyle is twenty millimeters and, six millimeters being allowed for the thin covering of integuments, placing one-half on each side of the measuring device, leaves the scale clear to read at a glance without calculation. Of course, in subjects carrying somewhat of cellular tissue over the head of the condyle, pressure must be exerted in proportion to allow for the additional thickness of adipose tissue, as the three millimeters allowed are intended only for the hard, tight-drawn external integument and capsular ligament.

The central sliding block supporting the hinge joint block is intended to register the median line of the face and mouth; it will also register the exact distance between the condyles and the central line of the mouth, as it frequently happens that the ramus of one side of the mandible extends further out on one side than the other. And in transferring these measurements to a properly constructed articulator it is desirable to reproduce this defect, as the swing laterally is different and may play an important part in a scientifically constructed denture.

Fig. 3 is a perspective view of the condyleometer adjusted to the face. The protractors are in place over the head of the condyles, the trial plates being in the mouth, having the thin horse-shoe metal plate adjusted to the lower bite plate; the hinge block attached to the central sliding block is adjusted to the horse-shoe plate in the mouth by a socket in the labial side of the hinge block and the two are held together by a spring pin. The vertical arms from the graduated bar are adjusted until

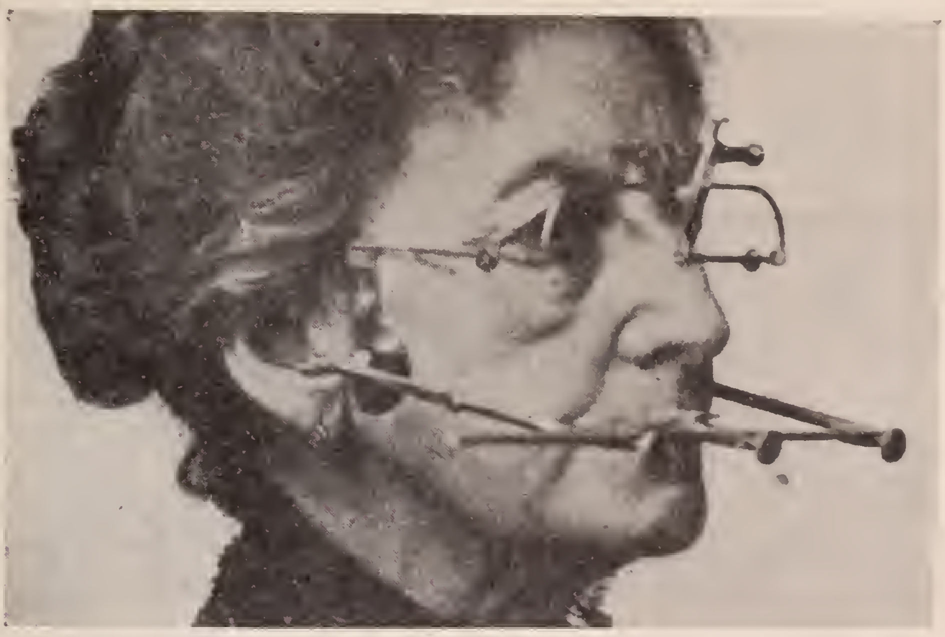

Fig. 3.

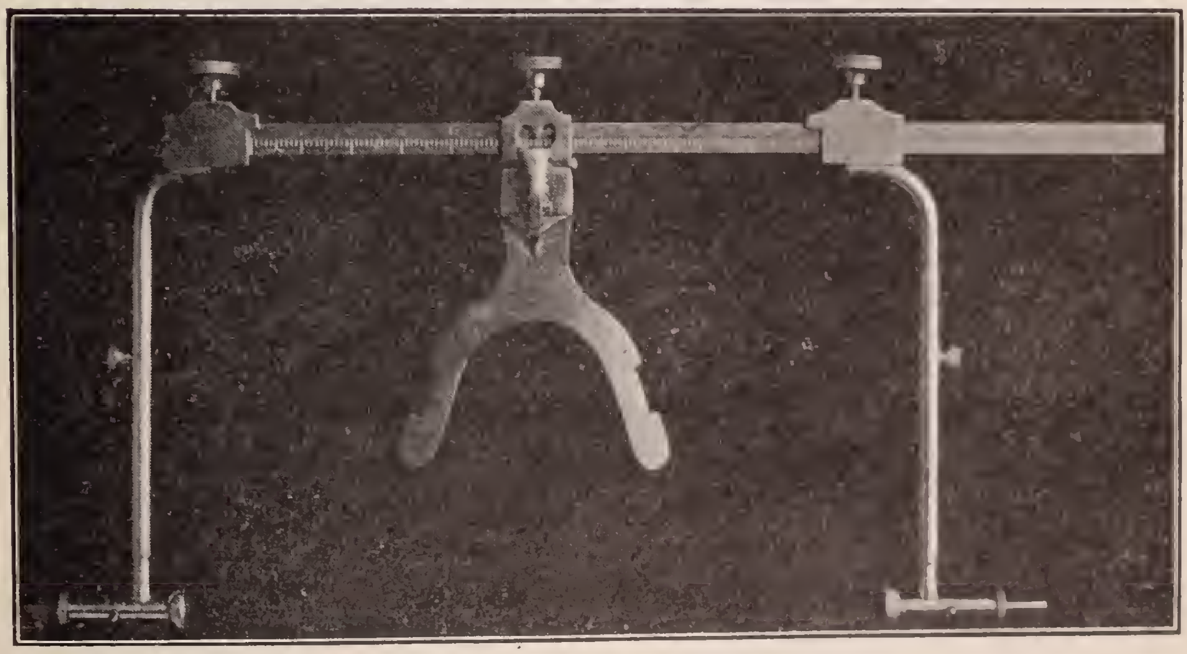

Fig. 4.

the spring-actuated points of the cylindrical box shafts rest in the central pit (under tension), of the protractors on either side. See that the central sliding block is in exact median line, then tighten up the thumb screw underneath and also the thumb screw of the adjustable or sliding block carrying the vertical arm. You are now ready to obtain the plane or inclination of the condyle path. Before adjusting the protractors, however, a small piece of wax (the size of a pin's head) should be laid on the central portion of the protractor plates and melted over a spirit lamp, forming a thin coating over the surface. The patient is now requested to vigorously open and close the mouth, as also to slide forward and back, and in doing so the flexible points mark lines through the wax film which are easily discernible, and when the apparatus is removed, any straight edge laid upon these lines will give you the number of degrees at a glance.

To obtain the distance from the center of one condyle to the center of the other, and from the condyles to the location of the central incision, the median line, etc.: the upper portion of appliance Fig. 1 is not used except in recording the inclination of the condyle path and lateral movements. Therefore, the little pointed shafts in the heads of the vertical arms are pressed back and locked in the side notches as shown in Fig. 4.

In this illustration is shown the horse-shoe bite plate attached to the hinge block and the manner of quick attachment and release. This is a very valuable feature, for it saves the necessity of having to remove a mass of outside appliance with the bite plates all together, particularly appreciated by the patient. It does not in any way affect the accuracy of the transfer of the models to the articulator, as the correct plane is retained by the locking of the two blocks together by the thumb screw, the point of separation being an accurately fitted socket. After removing the bite plates from the mouth they can be instantaneously reattached to the condyleometer and placed on the models for transfer to the articulator.

Like Dr. Gysi's registering device, all measurements are taken by the condyleometer from the mandible as being the jaw of motion and pivotal centers.

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# NATURAL TEETH LOST BY PYORRHEA REPLACED BY BRIDGEWORK*

BY A. W. NEWELL, D.D.S., COLUMBUS, OHIO

Remove the teeth and put them into a solution of water with a few drops of formaldehyde. The next thing to do would be to remove the pulps and fill the root canals of the teeth to which you will attach the bridge. Next thing will be to make lingual attachments on the teeth from which you removed the nerves, by using pure gold plate and clasp metal posts about 15-gauge, then take impression and bite with attachments in place and articulate.

Next take the teeth you extracted and saw the roots off below the enamel margin, then make caps over the teeth by using pure gold and clasp metal pin in pulp cavity.

Next you use a clasp metal wire, 14- or 15-gauge, running from abutment to abutment. Then set your teeth up, remove natural teeth and invest caps, lingual attachments, and bar all together and solder. Next cement your natural teeth to the frame work or bridge and last cement the bridge to the abutments.

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*Clinic at Ohio State Dental Society.

# THE EFFFCT OF NASAL RESTRICTION ON GUINEA-PIGS, RABBITS AND DOGS.*

## THE RELATION OF THIS INFLUENCE TO CONTRACTED DENTAL ARCHES, MAXILLARY AND OTHER SINUS DISEASE, TROPHIC CHANGES, MENTAL, NERVOUS AND GENERAL DISORDERS.

BY GEORGE V. I. BROWN, A.B., D.D.S., M.D., C.M.
ORAL SURGEON ST. MARY'S HOSPITAL AND CHILDREN'S
FREE HOSPITAL, MILWAUKEE, WIS.

THE CLINICAL RELATION between irregularities of teeth, contracted dental arches, high palatal vaults, and nasal defects which are intimately associated with diseases of the nose, throat, ear and nasal accessory sinuses as well as bronchial and pneumonic affections together with the more remote effects upon bodily conditions which are subject to these and similiar pathologic states is well understood.

Much of the widespread ill results of these disorders, and the marked benefit that is almost invariably evident when nasal relief is given by maxillary expansion effected through spreading the upper dental arch may be easily accounted for along these lines.

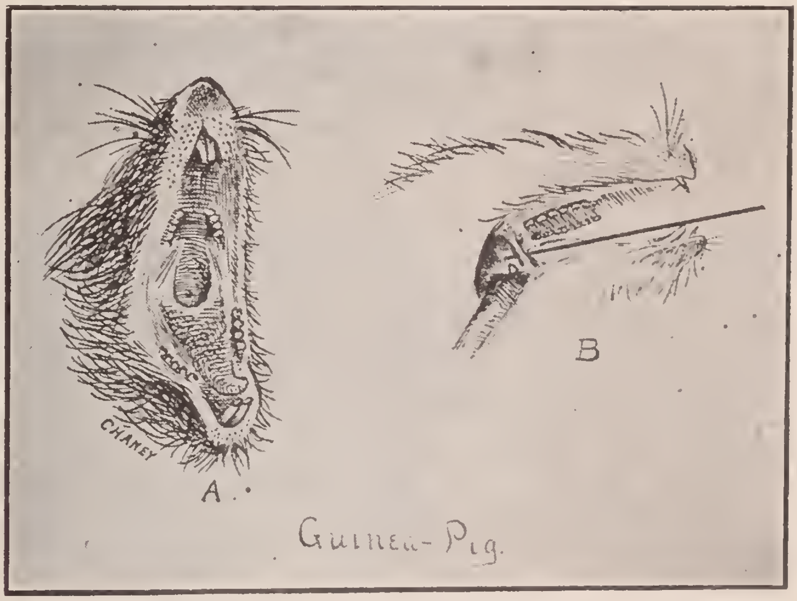

Fig. 1.

(A) Anterior view guinea-pig's throat, showing fauces and soft palate with sphincter-like opening.

(B) Lateral view, showing probe through opening in soft palate. (Anderson.)

There is, however, a growing feeling that the causes of both the ill results from such conditions, when neglected, and the benefits that have been noted from their correction, lie much deeper than may altogether be accounted for by these etiologic and pathologic factors.

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*Read before the Ohio State Dental Society, December, 1912

Recognition of this lends interest to the results of the experiments of the late Dr. Anderson, of Detroit, who closed the nasal openings of guinea-pigs, rabbits and dogs with cotton and by suturing the external nares, and my own treatment of puppies by which approximately the same conditions were brought about in a quite natural way by preventing growth across the maxillae in the region of the palate as shown by the illustrations.

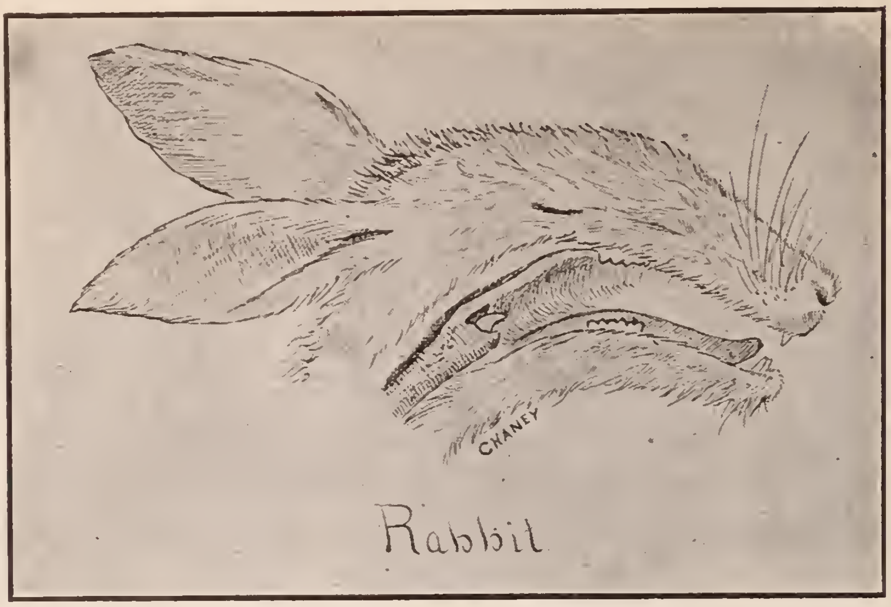


Fig. 2.
Lateral view rabbit's throat. (Anderson.)

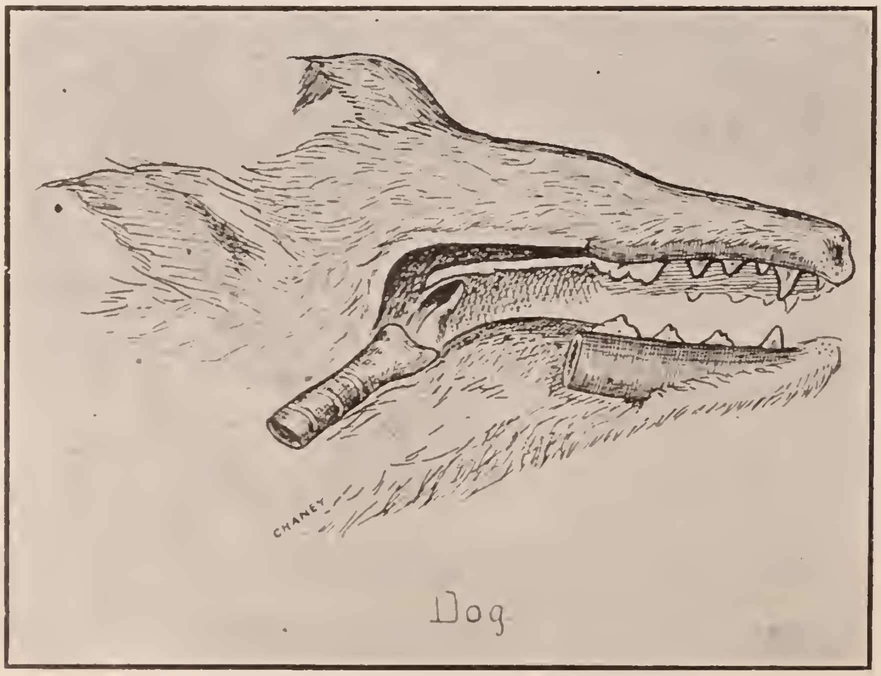


Fig. 3.
Lateral view of dog's throat. (Anderson.)

In all of these it may be noted there is practically the same general tendency to the development of certain symptoms which are not unlike those commonly found among children whose contracted upper dental arches and high narrow palatal vaults are familiar to all.

It seems to me it is of much significance to note that the ill effects of an impaired nasal respiratory apparatus although more marked in guinea-pigs and rabbits for which mouth breathing is practically impossible, except when swallowing, because of the form of the soft palate and pharynx as shown in the illustrations (see Figs. 1 and 2) and also in dogs that are only a degree better off in this respect, mouth breathing alone only being accomplished through the slits upon each side of the velum by unusual muscular effort, (see Fig. 3) are really much the same in a general way as those which affect children and even grown persons whose mouth breathing is associated with adenoids, hypertrophied tonsils, deflected nasal septa, spurs or other conditions which tend to constrict the nares or militate against free and unrestricted nasal respiration.

Clinically, we have proven that there is an increase in the size of the nares with corresponding tendency toward improvement in the form of the septum and in the reduction of hypertrophic conditions which represent the pathological results that are the invariable evidences of such mal-formations, and that these take place with almost mathematical regularity when the upper maxillae have been forced apart by separation through the median palatine suture without objectionable local or general disturbance. Early treatment of this character can also do much to prevent such defects. The nasal processes of the superior maxillary bones are forced apart when these bones are separated by direct pressure across the palate and they carry with them, to some extent at least, the attached nasal bones. Thus there is an actual increase in the internal measurements of the width of the nose. It also makes possible a separation of the ridges which form a groove for reception of the vomer. This allows the natural resiliency of the septum to take advantage of the additional space thus afforded with corresponding tendency toward straightening of its curvatures. The increased volume of air thus permitted reduces hypertrophic conditions of the intra-nasal soft tissues, and gives freedom in the region of the ostea of the nasal accessory sinuses which permits better drainage, and aeration of these cavities with marked increase in their healthfulness.

Other pathologic indications of imperfect respiratory conditions, and corresponding evidences of individual improvement might also be adduced, but it is when inversely considered that the results of this animal experimentation become most interesting because in these creatures all questions of heredity, degenerate tendency and similar factors must be excluded.

Defects of nasal or similar mal-development, aberrant trophic changes, susceptibility to pneumonic or other diseases, or any of the series of nervous, organic and other disturbances that are evidenced by the animals for which we have artificially restricted nasal respiration appear before us stripped of the perplexing confusion of ultra scientific etiologic reasons to account for their being, and can only be viewed purely in the light of the direct effects of the conditions produced by our treatment.

Study of Dr. Anderson's charts shows that the length of the life of the guinea-pigs and rabbits was materially shortened, they could not live long in this condition, the hearts of these animals became enlarged (Fig. 4), the adrenals and other organs affected with a general lowering of resistance to diseases which predispose to infections among which broncho-pneumonia, sero-purulent pleurisy and other inflammatory lesions are conspicuously evident. The lives of the dogs were also materially shortened; they became hairless and their skin assumed the wrinkled appearance that is characteristic of many diseased conditions. (Fig. 5.)

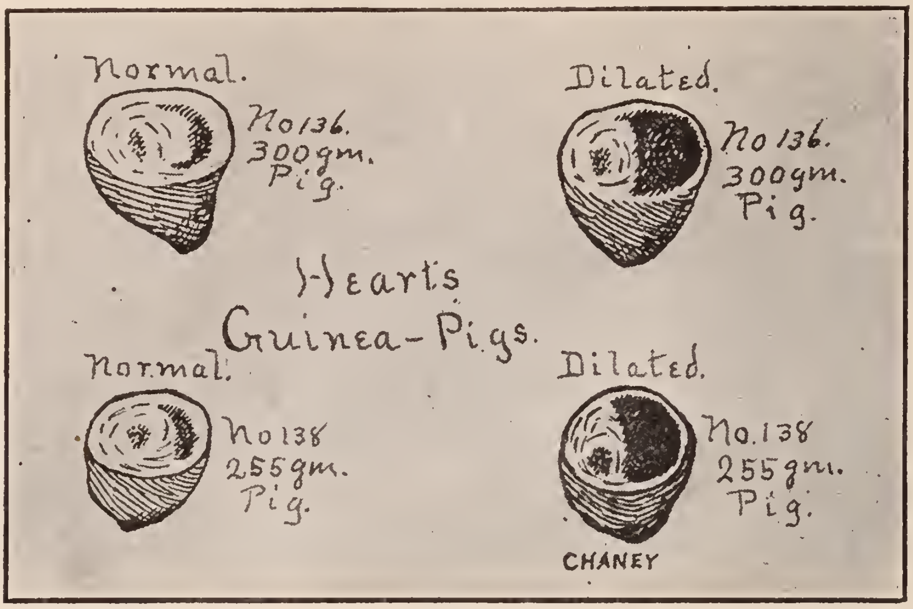


Fig. 4. (Anderson.)

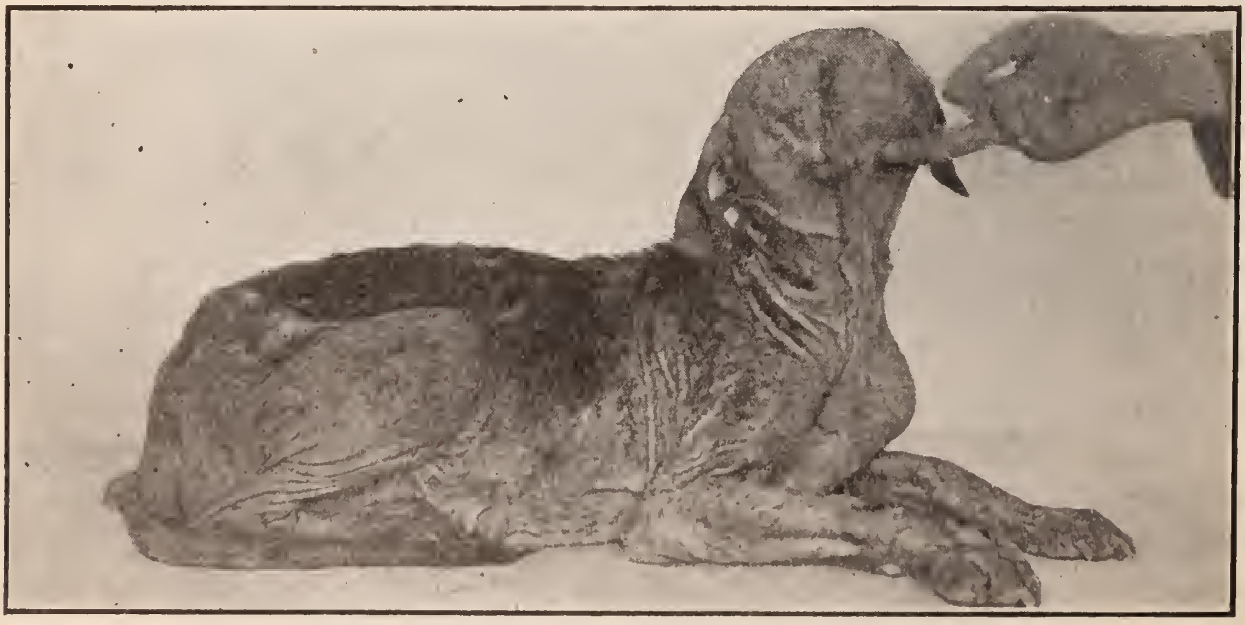


Fig. 5.

Showing loss of hair and wrinkling of skin following nasal obstruction. (Anderson.)

According to Dr. Anderson the following conclusions are suggested by the results of the experiments:

1—*That nasal obstruction leads to death, or serious impairment of vitality.*

2—*That the lowered resistance predisposes to infections.*

3—*That local disease of the respiratory tract is induced.*

4—*That obstruction of the nostrils leads to dilatation of the heart.*

5—*That changes in the skin and the blood of the dogs occur.*

6—*That symptoms resembling asthma and emphysema may be induced in the lower animals.* (*Fig.* 6.)

7—*That emphysema of the lungs can be demonstrated histologically.*

8—*That re-opening of the occluded nostrils is followed by prompt disappearance of the symptoms.*

Through the courtesy of Parke-Davis, is whose Biological and Research Department I have been permitted to do original research work on puppies, and with the able assistance of Dr. Ferry and his associates in the laboratory, a series of experiments has been carried on during the past two years. The first of these I have previously reported as follows:

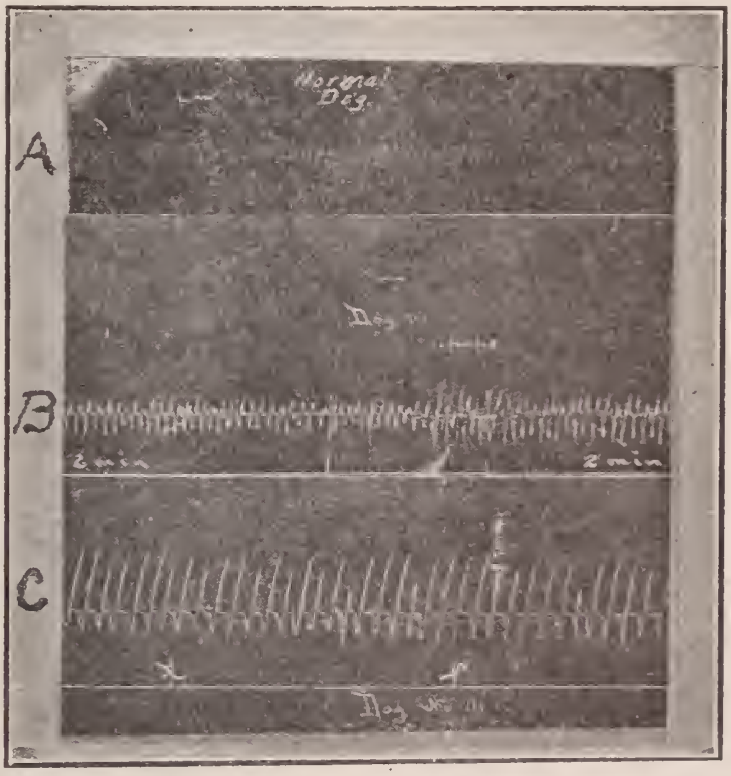
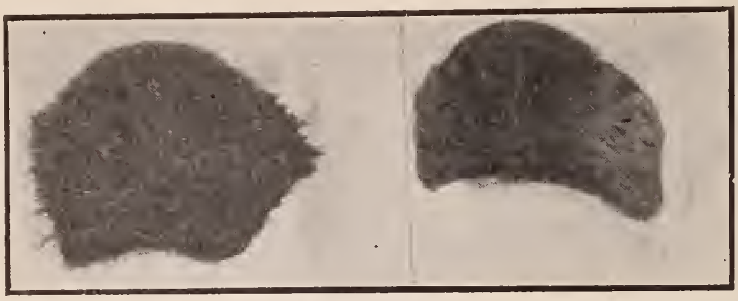


Fig. 6. Pneumatograms.

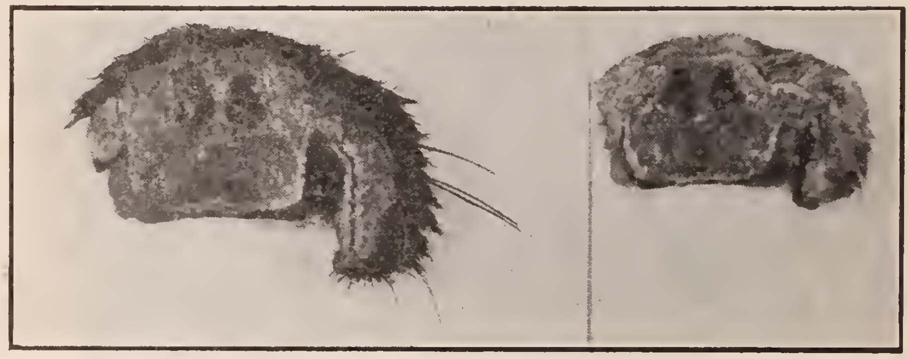
(A) Normal dog. (B) Dog with nasal obstruction. (C) Dog with Dyspnoea. (Anderson.)

"Several pups eight weeks old were operated upon by passing wires through the maxillae from a point above the roots of the teeth upon one side above the palate and out at a corresponding point upon the opposite side. The palate was compressed sufficiently to force the upper teeth inside or in lingual occlusion with the lowers, so that the upper and lower jaws of these puppies were placed in about the same occlusal relation that exists with growing children whose bicuspid teeth meet the corresponding lower teeth in lingual (inside) instead of buccal (outside) or normal occlusion. Not nearly so much force in compression was used as would be necessary to close a palate fissure according to the method which was formerly widely practiced upon infants with cleft palate. The purpose was to reproduce as nearly as possible the maxillary conditions of typical cases of mouth-breathing children. One pup was kept without operation as a control and all were allowed to develop until they reached



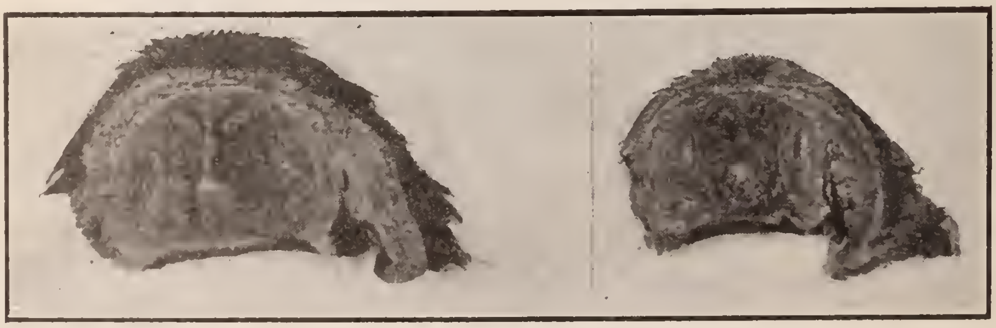
(a) Fig. 7 (b)

Sections of the tip of the nose. (a) Normal pup. (b) Pup for which I artificially restricted upper maxillary development.



(a) Fig. 8 (b)

Second sections of pups' heads. (a) Normal pup. (b) Pup for which I artificially restricted upper maxillary development.



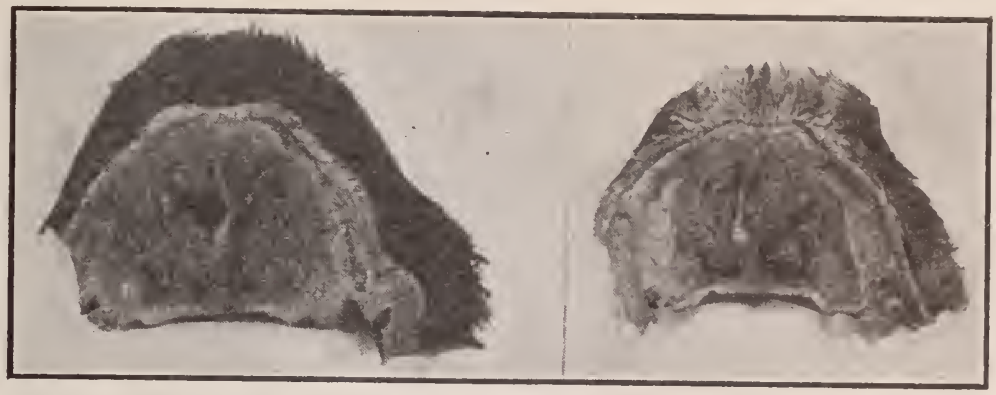
(a) Fig. 9 (b)

Third sections of pups' heads. (a) Normal pup. (b) Pup for which I artificially restricted upper maxillary development. This section shows almost complete nasal stenosis at point of greatest constriction.

the age of six months, which it was estimated, would approximately correspond to the age of a child eight or nine years old. The puppies were then killed, the heads frozen and sections cut through the nose and upper jaws at short intervals. The result is shown in figures 7 A and B, 8 A and B, 9 A and B, 10 A and B, 11 A and B. Marked difference between the nares will be noted throughout both series but the section marked 9 in each is exactly at the point where compression was made.

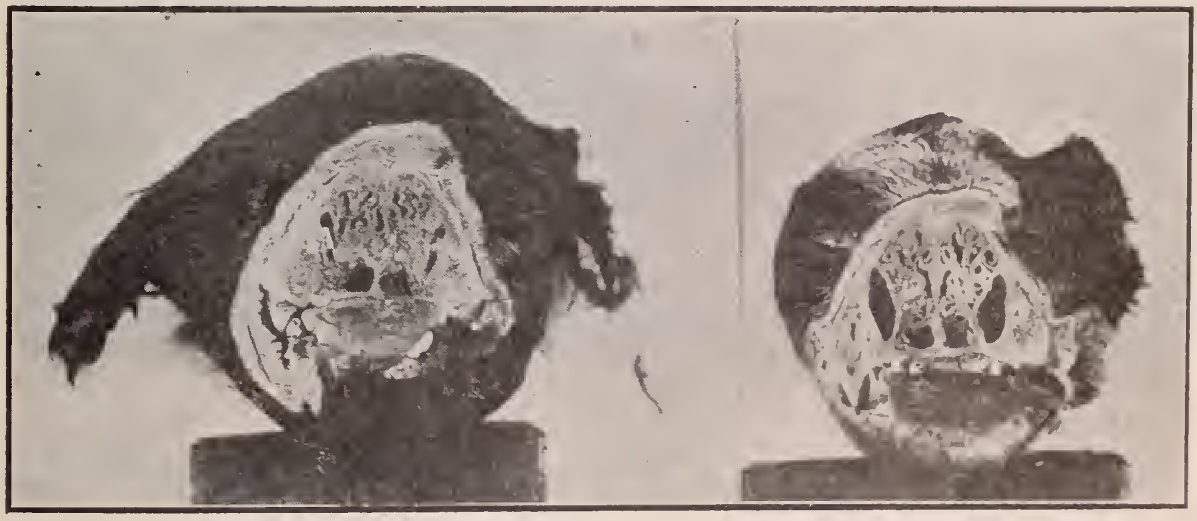
The almost complete stenosis in the sections of the experiment pup contrasted quite strongly with the same section in the control.

In the course of this experimental work on dogs other symptoms were noted in the puppies that were quite similar to those found in children whose upper jaws were similarly although more naturally constricted. The ones operated upon developed a high degree of nervousness which corresponded to the nervous condition of such children, and inasmuch as the nervousness of the dogs was apparently caused by the effect of buccal and nasal conditions it offered a fair explanation of the clinical experience that these children almost invariably became less nervous after the expansion appliance has been inserted and a measure of maxillary and nasal relief thus afforded.



(a) Fig. 10 (b)

Fourth sections of pups' heads. (a) Normal pup. (b) Pup for which I artificially restricted upper maxillary development. This section shows marked deflection of the nasal septum.



(a) Fig. 11 (b).

Heads of the puppies from which the previous sections were taken. (a) Normal pup. (b) Pup for which I artificially restricted upper maxillary development. Marked enlargement of the maxillary sinuses is shown in b.

The almost perfect resistance of the pharyngeal and bronchial mucous membrane of healthy dogs to the action of pathogenic bacteria has been proven by experimentation. This is lost when the air passages are obstructed from any cause. The marked susceptibility to infection thus produced in these pups was undoubtedly accountable for congestion of the lungs found in one of the experiment pups and other evidences of disease in others. This was exactly in accordance with the frequent colds, bronchitis, and tendency to pneumonic affections that are characteristic of all mouth-breathing children.

The enlarged maxillary sinuses of the experiment pups when compared with the slit-like openings of the normal dog (see Fig. 11) are also in accord with the clinical evidence that individuals affected by high narrow contracted palates and nasal defects almost invariably have enlarged, and as it is now becoming better understood, diseased nasal accessory sinuses also.

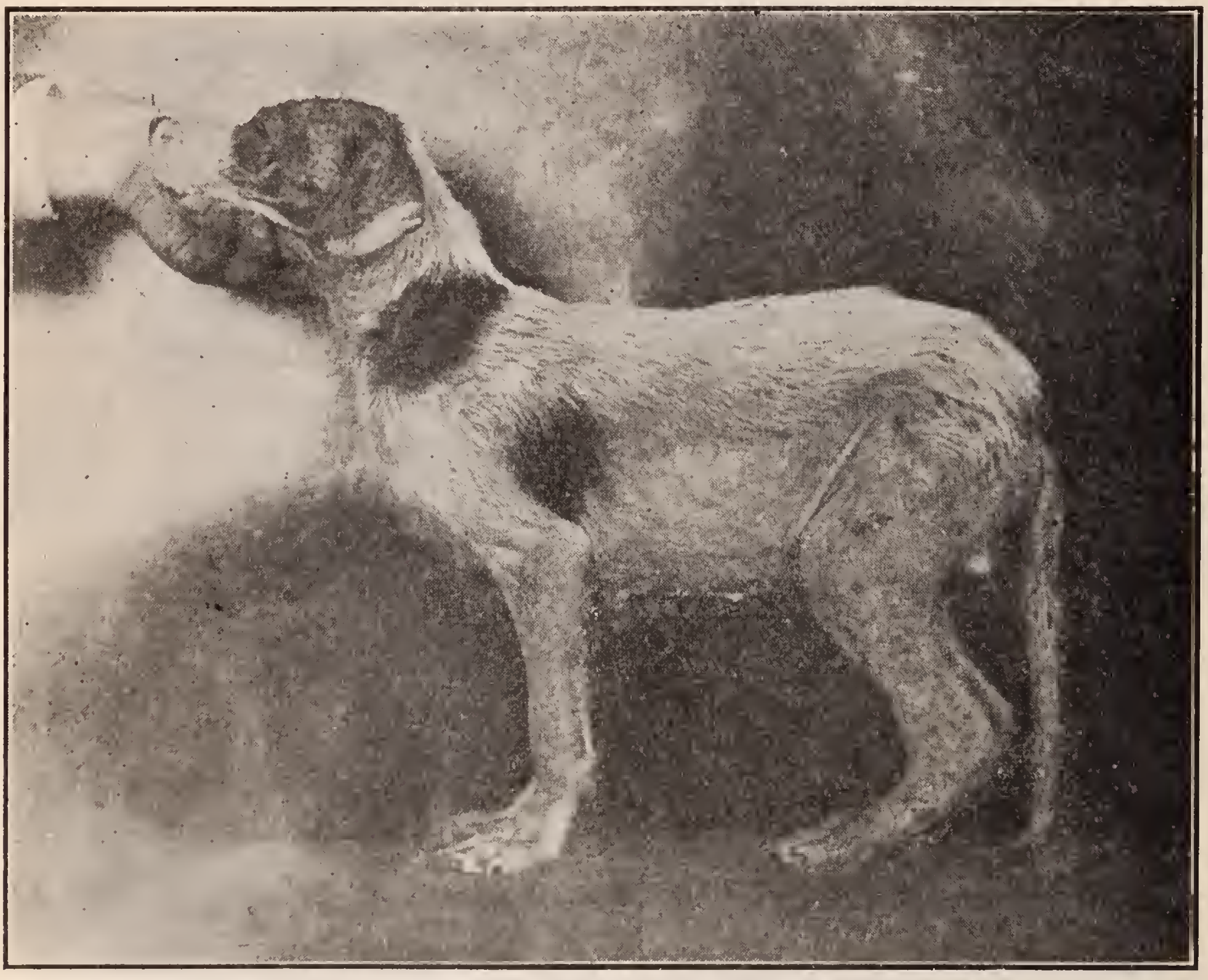


Fig. 12.

One of Dr. Anderson's pups, the appearance of which is almost identical with that of all the pups for which I restricted maxillary development by compression, except that mine were even more emaciated.

All of the puppies operated upon were given the same food and care as the control pup, but by the time they were all six months old there was marked difference in size. The control pup was nearly twice as large and fat as the others in all respects and in good condition. One of the experiment pups died before the expiration of this period and was almost a mass of skin and bone. The ones that lived were emaciated, and their general as well as local development appeared to be almost wholly arrested. (Fig. 12.) This result was analogous to one of the features of the effect of maxillary separation and nasal expansion in the treatment of children. It has been a matter of gratification and of much scientific interest to note the more or less marked stimulation of constructive trophic changes that frequently occur during the course of this treatment. Increase in weight and prompt stimulation of general growth, especially in children whose small size indicated that the natural development to be expected in accordance with their ages had for some reason been arrested.

The concentration of all this canine and human evidence has crystalized itself in our minds into the belief that there is a more direct transmission of influence between the growth centers of the brain and the naso-maxillary region than has been commonly appreciated.

Since compression in this region induced by mechanical means such as was employed in our experiments or more natural influences found under conditions of malocclusion lead to arrested or perverted nasal and maxillary development and any other cause that may produce a similar effect will lead to a like result, it seems not improbable that through the influence of other facial bones in their developmental relation with the bones of the head and particularly with the sphenoid the form of the sella turcica might be altered and thus the influence extended to the pituitary body. Separation of the maxillae might thus convey in the course of time a measure of influence resulting in greater freedom in osseous development which might be influential in affecting the pituitary body and the developmental functions of the hypophysis. The experiments I have now under way in effort to prove the truth or falsity of these positions are not completed and will necessarily require time to secure positive results but by way of preparation it seems advisable at this time to consider some of the evidences which have led to our present expectation that there is a great underlying principle which, if understood, would be far-reaching in its effect upon nervous and other diseases of general as well as local character. It is well known that the regions of the face, nose, mouth and jaws give frequent evidence of the so-called stigmata of degeneracy. Neurotic tendency is commonly associated with contracted palates, irregular dental arches and nasal defects.

In the presence of a society such as this is I feel it unnecessary to go farther with illustrations that might be continued almost indefinitely in proof of the statement that there is beyond question a close association between underlying nervous states and developmental influences which affect this region.

The question thus arises, can factors governing the growth of other parts be affected by nasal and maxillary relief beyond the natural constructive processes which might reasonably be expected from improved respiration? Careful study of the general form of patients that were sent to me by rhinologists for maxillary expansion because of the usual train of symptoms found in cases of deflected nasal septum, contracted nares, mouth breathing, high narrow palatal vaults and the usual adenoids and enlarged tonsils has brought to light certain interesting features. In a number of patients one side of the face was found to be more developed than the other and this was evident in a degree beyond that which would naturally be expected from the existing dental irregularity. Many of them were found to have one shoulder-blade larger than the other. Quite frequently they had also slight curvature of the spinal column. In others, again, palmar wasting and an enlarged appearance of the thumb upon one hand was apparent. In others, still, contraction of the toes and other mal-development of one foot upon the affected side was noted. It is well known that collectively these symptoms represent certain types of muscular dystrophy.

(*Continued in December Summary*)

## NEW PUBLICATIONS

*The American Text-Book of Prosthetic Dentistry.* In Contributions by Eminent Authorities. Edited by Charles R. Turner, M.D., D.D.S., Professor of Mechanical Dentistry and Metallurgy, Department of Dentistry, University of Pennsylvania, Philadelphia. New (4th) edition, thoroughly revised and rewritten. Octavo, 856 pages, with 900 engravings. Cloth, $6.00, *net*. Lea & Febiger, Philadelphia and New York, 1913.

This work is intermediate in character between the hand-book, which is intended to furnish the main facts upon a subject briefly and succinctly, and the work of reference, which as a final authority must give an exhaustive treatise upon its topic, and is primarily designed as a teaching volume. It stands for and adheres to the general pedagogical principle that a thorough knowledge of the fundamental principles of the subject must first be inculcated, so that the student may attack his problems by the analytical method instead of by rote or authority. After this foundational knowledge is obtained, the technical procedures necessary to construct the various appliances employed in prosthetic dentistry may be undertaken, instead of making the latter first in time and importance. That this method has been in accord with the present pedagogical practice is attested by the fact of the widespread adoption of the work as a text book in the colleges of this country. The corps of contributors to this volume is composed of foremost prosthetists and each one has written with skill upon the particular division of the subject to which he has devoted special attention. The thoroughness of the revision of the book may be judged by the fact that upwards of three years were consumed in producing this edition, many parts being rewritten several timesi in order to exhance the excellence of the finished product. The illustrations have received equally careful attention and many new ones will be found in the elaborate series of engravings.

*Anatomy, Descriptive and Applied.* By Henry Gray, F.R.S., Fellow of the Royal College of Surgeons; lecturer on Anatomy at St. George's Hospital Medical School, London. New (American) edition, thoroughly revised and re-edited, with the ordinary terminology followed by the Basle Anatomical Nomenclature, by Edward Anthony Spitzka, M.D., Director of the Daniel Baugh Institute of Anatomy and Professor of General Anatomy in the Jefferson Medical College of Philadelphia. Imperial octavo, 1502 pages, with 1225 large and elaborate engravings. Cloth, $6.00, *net;* leather, $7.00 *net* Lea & Febiger, publishers, Philadelphia and New York, 1913.

For years Gray's Anatomy has been recognized as the standard work on this subject and the announcement of a new edition is always a matter of interest. The revision for this edition has been thorough and the work has been brought abreast of the latest knowledge of anatomy and the most approved methods of presentation, Descriptions of undue length have been curtailed and difficult passages in the text have been clarified, so that the essentials are here embodied into a fairly complete account of the structures of the human body and their development. Under the heading of Applied Anatomy many important medical and surgical considerations are discussed. It is generally conceded that anatomy will soon be taught according to the Basle Anatomical Nomenclature, and the B. N. A. terms have therefore been introduced in parentheses following the ordinary terminology, which is still in general use, so that either or both may be used with facility. Illustrations have been added from original drawings and preparations. Colors are abundantly used and dissecting directions accompany the descriptions of the parts. Its combination of unrivaled engravings and an incomparably clear text, reflecting the life-work of many of the world's masters of anatomy, and its peculiar quality of presentation which facilitates to the utmost the acquisition and retention of a sound knowledge of its subject, have maintained it in the first position of all text books on anatomy for over fifty years, and it was never stronger in attraction or farther in advance of its competitors than in this new edition.

*Exodontia.* A practical treatise on the technic of extraction of teeth, with a chapter on Anesthesia. By George B. Winter, D.D.S., Professor of Exodontia and Lecturer on Anesthesia, St. Louis University School of Dentistry. American Medical Book Co., publishers, St. Louis, Mo, U. S. A. Price $4.00.

Exodontia is a new term used to denote extraction of teeth. In various books hitherto published the subject of extraction has been only briefly discussed and the matter not as specifically treated as the subject demands. It is, so far as we know, the only book devoted exclusively to the subject. The author has presented the technic of extraction in an original, intelligent and comprehensive manner, the entire text being clearly written and very systematically arranged. The various extractions have been classified so that the regular order of sequence in which they are presented materially assists in conveying a complete conception of the entire plan of procedure. The instrument to be used for each tooth is indicated and the manner of its application to a certain tooth is plainly set forth. The extraction movements for each tooth are described in such a lucid manner as to be easily comprehended, and special care has been taken to make plain the extraction of impacted inferior third molars. In addition to this the author has considered the complications that may arise in an operation, and has shown how these contingencies are to be treated. All of the operations of extraction have been illustrated in a manner that leaves no doubt as to the method to be followed, and full size illustrations, being perfect reproductions of the originals, are given of the various instruments to be used in extraction. The half-tone illustrations, of which there are 251, form a prominent feature of the book. In addition to numerous illustrations showing both normal and abnormal physiologic conditions of certain tooth areas, there are fifteen full-page reproductions of crown and root phenomena, which convey an idea of the possibility of root conditions that may be present in cases of tooth extraction. There is also a chapter on general and local anesthesia, which contains considerable information on this adjunct to extraction. The book contains over 400 pages, is printed in good style on first-class half tone paper, and the index has been carefully prepared for ready reference.

## The Dental Brief to Suspend

Announcement is made by The L. D. Caulk Co., publishers, that, with the December number, the publication of *The Dental Brief* will be discontinued.

Increasing business demanding attention that cannot be devoted profitably to the publication of the magazine is given as the reason for the change in policy.

# EDITORIAL

## The Ohio State Board of Health Assisting in the Oral Hygiene Campaign

The beneficial effect of having a dentist on the State Board of Health is being manifested in Ohio. Prior to this year the subject of oral hygiene and the necessity for better care of the teeth was not given consideration by the Ohio State Board of Health, or, we might add, by other State Boards of Health.

Attention of the members was drawn to the influence of good teeth and oral hygiene on the health of the people, at a meeting in Dayton, last December, when the Governor-elect of Ohio called a conference of members of the State Board of Health with representatives from the State Medical, Dental, Veterinary and Pharmacy Boards and Associations, and State Registrar of Vital Statistics, to talk over ways and means of better conservation of public health. At that meeting oral hygiene and the benefits from better care of the teeth received considerable attention from the physicians as well as dentists present. Later Gov. Cox appointed Dr. Homer C. Brown, of Columbus, a member of the State Board of Health and through the appointment of a dentist on the Board, oral hygiene is receiving equal attention with other subjects by the Board and in their public health exhibit. Dr. McCampbell, Secretary of the Board, is an enthusiastic advocate of oral hygiene and has given great aid in this direction. This Public Health Exhibit is the latest enterprise of the State Board of Health in its campaign to carry the "Gospel of Good Health" into every county in Ohio.

The exhibit is quite elaborate, including a large number of electrical and mechanical devices which graphically emphasize the need of precaution in blocking the spread of preventable and infectious diseases. (In this a dental exhibit is included.) Every night during the exhibit there are free public lectures on public health topics which are of definite interest to every citizen of the community in which the exhibit is being given.

These lectures are given by experts in the different lines of public health work, who are sent by the State Board of Health. Where possible the lectures are illustrated by especially prepared slides and moving picture films relating to the subjects under consideration. On the closing night of the exhibit remarks regarding the work are requested from a public, school and church official, a layman, a health officer, a physician and a dentist, and then a local Public Health League is formed.

The exhibit was first given in Marysville, one week the latter part of September. The next place of exhibit was Marion at which place the following program was carried out:

Marion Exhibition and Campaign Oct. 1st to Oct. 8th, 1913. Lectures given:

*Wednesday evening, Oct. 1st*—Dr. E. F. McCampbell, Columbus, Secretary, Ohio State Board of Health, lectured on "Some Problems of Public Health Work in Ohio." Film, "On the Trail of the Germs," 1,000 feet.

*Thursday evening, Oct. 2d*—Margaret Kamerer, R. N., Columbus, State Supervising Nurse, Division of Tuberculosis, Ohio State Board of Health, lectured on "The Work of a Visiting Nurse." Illustrated with 30 slides. Film, "The Visiting Nurse," 1,000 feet.

*Friday, Oct. 3d, at 8* P. M.—Homer C. Brown, D. D. S., Columbus, member Ohio State Board of Health, President National Dental Association. "The Place of Oral Hygiene in Public Health Work." Illustrated, 30 slides. Film, "Toothache," 1,000 feet.

*Saturday, Oct. 4th, 8* P. M.—Charles F. F. Campbell, Columbus, Executive Secretary, Ohio Commission for the Blind. "Blindness and Its Prevention." Illustrated, 30 slides. Film, "Blindness," 500 feet.

*Monday, Oct. 6th, 8* P. M.—Wm. H. Dittoe, Cer. Eng., Chief Engineer, Ohio State Board of Health. "Some Fundamental Facts of Sanitary Engineering."

*Tuesday, Oct. 7th, 8* P. M.—F. G. Boudreau, M. D., Columbus, Chief, Division of Communicable Diseases, Ohio State Board of Health. "Some Simple Facts About Common Diseases."

*Wednesday, Oct. 8th, 8* P. M.—Robert G. Paterson, Ph. D., Columbus, Chief, Division of Tuberculosis, Ohio State Board of Health. "What We Have Tried to Do." "The Value of the Exhibit to Our City," public official, school official, church official, layman, health officer, physician, dentist, 5 minutes each. Film, "Hope," 1,000 feet. Organization of Marion County Public Health League. Election of Temporary Chairman, election of Temporary Secretary, appointment of Committee on Constitution, appointment of Committee on Nominations, set date for next meeting to complete organization.

This will give the reader an idea of the health campaign the Ohio State Board of Health is waging by this traveling exhibit.

It is a most worthy cause for the promotion of better health conditions in our state and everyone should take an interest in it. This applies particularly to dentists throughout the state. It is the duty of every dentist to give all the assistance possible not only in aiding the exhibit but in urging his patients to attend the meetings especially on the night that the subject of oral hygiene is considered.

This work of the Board will do much to further the dissemination of knowledge of dental and oral hygiene among the masses but this is no reason why dentists should relax their individual efforts along this line. On the other hand it should spur them on to renewed effort. There will be much left to be done through the County Public Health Leagues organized and dentists should have representation in every League.

It gives the dental profession of the State a grand opportunity to organize in each community as it should for the carrying on of a thorough and successful campaign for better dental and oral conditions which means so much to the health of the people in all communities.

It is fortunate that we have a dentist on the State Board of Health, especially one so well fitted for the position as Dr. Brown, for the recognition and representation means much to the dental profession aside from the teaching that the Board is doing.

The Oral Hygiene Committee of the Ohio State Dental Society, of which Dr. E. W. Martindale is chairman, is giving all the assistance they can and we suggest that dentists in each county of the state, or through the state or component dental societies having representation in the various counties, take the matter under consideration and in this state campaign work with, or through, the dentist member of the State Board of Health.

Since this editorial was written the State Board of Health have rearranged their November and December meetings so as to meet in Toledo at the time of the State Dental Society meeting and have accepted an invitation to be present at the big dinner and health conference on Wednesday evening, December 3.

## A Meeting That All Dentists Should Attend

A great treat is in store for Ohio dentists and others who can get to Toledo Dec. 2, 3, 4, 1913. The Ohio State Dental Society meeting this year promises to be one of unusual interest. Hon. James M. Cox, Governor of Ohio; Dr. Simon Flexner, Director of the Rockefeller Institute of New York; Dr. Victor C. Vaughan, President of the American Medical Association and Dean of the Medical Department, University of Michigan; Dr. E. F. McCampbell, Secretary of the Ohio State Board of Health; Dr. Louis W.Ladd, Bacteriologist, Cleveland, are all expected to be there and take part in the meeting. The essayists and clinicians from the dental profession are such men as: Dr. Edward C. Kirk, Philadelphia; Dr. Clarence J. Grieves, Baltimore; Dr. F. T. Van Woert, Brooklyn; Dr. Thomas B. Hartzell, Minneapolis: Dr. F. H. Skinner, Chicago; Dr. Karl C. Knoche, Chicago; Dr. J. M. Thompson, Detroit; Dr. Marcus L. Ward, Ann Arbor; Dr. J. H. Prothero, Chicago; Dr. W. J. Greenfield, Wichita, Kansas; Dr. Henry Raymond, Detroit; Dr. Edward B. Spalding, Detroit: Dr. George H. Wilson, Cleveland; Dr. M. H. Fletcher, Cincinnati; Dr. J. V. Conzett, Dubuque, Iowa; Dr. Homer C. Brown, Columbus; Dr. G. N.

Wasser, Cleveland; Dr. Alden Bush, Columbus; Dr. S. Marshall Weaver, Cleveland; Dr. W. I. Jones, Columbus; Dr. W. T. Jackman, Cleveland; Dr. Sidney J. Rauh, Cincinnati; Dr. F L. Olds, Toledo, etc. Some departures from the regular routine will be made. The clinics Wednesday and Thursday mornings will be *progressive*, given by twenty star clinicians to classes of as many as can be accommodated at each clinic.

On Wednesday evening there will be a big dinner and Health and Science Conference.

The program is elaborate and the essays and clinics of such interest that no dentist can afford to miss them. It is an unusual opportunity to add to your store of knowledge about things dental. Cross the dates from your appointment book and go. You will be benefitted from having attended and so will your patients.

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## Hints On Practice Building

A man is a unit; he is not a conglomeration.

Man cannot be a Sunday Christian and a week-day reprobate.

"No man can serve two masters; he will cling to one and forsake the other."

The thing in man that determines all his acts is his Character. Character is a word that means simply general tendency.

Character is developed by thinking and acting and in turn expresses itself through thinking and acting.

A miser who stints his family six days in the week and drops a dollar in the collection-box on Sunday is no less a miser for that.

A man who does not play the part of a man on Monday, and on Tuesday, and on Wednesday and every other day in the week except the first, cannot redeem himself by piety on Sunday.

A man who does not pay his debts as he goes along, every day in the week, cannot square his character with Right Living (righteousness) by contributing to the support of the preacher.

A man who loves a dollar so well that he cannot recognize the difference between the dollar that belongs to him and the dollar that belongs to some other man, cannot take the kinks out of his character by contributing a dollar to charity now and then.

It isn't so very hard for a man to make sacrifices by proxy to give a dollar for benevolence, ninety cents of which belongs to some other man.

Character is thinking and doing, the essence of thinking and doing, an essence that remains as tendency within the mind and inner being of the man long after the particular thought and act that produced it have been forgotten.

I once heard a particularly upright man say that the memory of a shameful experience in which he took part as a young man often returned to haunt him and shame him, particularly at just those times in his life when he sought the most intimate relation with all that was good and noble in him.

A man who holds up another man at the point of a pistol and robs him of his money is called a highwayman; the man who enters another man's house in the dead of night and takes money or goods that belongs to that other man, is called a thief; the man who uses his knowledge of conditions and his superior cunning to defraud another man under cover of law, is called a trickster. For all of these our criminal statutes provide what is meant to be adequate punishment. We try to "make the punishment fit the crime."

"Intention makes the crime." All of these men show by their acts that their intentions are criminal. Proof of the commission of the act is all that is necessary to convict in such cases.

But there is another kind of dereliction that is not yet called criminal, although, from the standpoint of intention (and that means character), it is no less so. Our laws define certain acts as crimes; acts not so defined are not yet crimes, although, so far as intention and results are concerned, it would require a pretty strong microscope used in X-ray light, to detect the difference sometimes.

To take from another man something that belongs to him and not to me, something for which I have not given and do not intend to give an equivalent in value, no matter how, no matter whether the method by which the act is accomplished is criminal by statute or otherwise, differs in no quality or degree, so far as its effect upon CHARACTER is concerned, from any other act aimed to accomplish the same results—and Character is the man.

Some men contract debts that they do not intend to pay. Some men contract debts that they know they cannot pay. Some men contract debts that they think vaguely that they may pay some time, if convenient, but intend to avoid paying as long as possible.

Such men do not run any risk so far as our criminal laws are concerned; the debt is merely a "civil" matter; the creditor may bring suit and get judgment—much good may it do him; such men are usually so well covered by feminine skirts or in some other equally creditable (?) manner as to be execution proof; and there the matter ends.

In ordinary business, a man who ever has had a judgment entered against him has lost character; judgments unpaid are a positive bar to further credit. Judgments are not taken unless the case is a desperate one. Big business men, far more lenient and considerate than little fellows, hesitate before taking action that they know will destroy the character of the debtor; because they know that a judgment is a danger signal that all other business men will heed; that it will say to the world that here is a man who is willing to take from other men money that belongs to them in such a manner as to avoid risk of criminal prosecution; that here is a character that differs in no way from that of the open violator of criminal laws except that it is deficient in courage; is lacking in the true sporting spirit that always seeks activity in ways that give "the other fellow a chance."

The man who takes from other men things that do not belong to him by abusing his credit privileges, is not a "sportsman;" he is not only dishonest, but is also a coward; is a man who seeks always the "cold end of the poker;" is the same kind of man as he who tries to win at cards by "holding out the ace." Such a man is not even a gambler; he is a "sure-thing" man.

Now, what has all this to do with Practice Building?

What connection is there between my heading and all that has been written? Just this:

Any true success depends upon Character; no real and lasting success ever has been or ever can be achieved by men who may be classed with any of those described.

Character can no more be hidden than can the sun. It crops out in every act of life, in everything that we do and say; in our everyday intercourse with our friends and neighbors; in our walk, in our talk, in our sleeping and in our waking.

Character builds our bodies, and expresses itself in every part of them. There are some very wise men in the world. Some whose intellectual powers have been developed to an extraordinary degree. These men say that they can judge a man's character by a square-inch of skin taken from any part of his body. A thumb-print is an infallible guide to such men, not only in the identification of his body, but in the reading of his character as well.

A dishonest debtor is a dishonorable man, and that fact cannot be hidden under a bushel or behind a mountain. People who come into contact with him may know nothing about the circumstances, but they are repelled by an impalpable atmosphere that hangs about him, accompanies him wherever he goes, and is as truly a danger-signal as is the judgment recorded against him to the men from whom he seeks credit.

Man has lost most of his instincts for physical things, but many have developed it to a large degree along moral lines. A dishonorable man is an immoral man; he would be a criminal if he had sufficient courage to take a "sporting chance." Such a man exudes a psychic or moral atmosphere that repels just those he most needs to attract if he is to succeed in building a business, or a practice.

Honorable methods, straightforward, square dealing, are in no line so essential as in the practice of dentistry. No other business or professional man comes into such intimate contact with his clients as does the dentist. No other man is so vulnerable, so open to the penetration of prying instincts as is the dentist; therefore, no other man so much needs the protection, the influence, the practice-building power that rests solely under the sign of an upright, manly, give-and-take character, the lack of which, were all the facts known, would explain the reason for many a failure.

This is what my subject has to do with what has been written.

G. E. Harter.

# SOCIETY·ANNOUNCEMENTS

## South Dakota State Board of Dental Examiners

The next regular semi-annual meeting of the South Dakota State Board of Dental Examiners, will be held at Sioux Falls, South Dakota, on Tuesday, January 13th, 1914, at 1:30 P. M. Application for examination should be made between the dates of January 1st and 10th or for further information address ARIS L. REVELL, *Sec'y.*,

Lead, South Dakota.

## New Jersey State Board of Dental Examiners

The New Jersey State Board of Dental Examiners will hold their regular annual meeting and examination in the Assembly Chamber of the State House, Trenton, N. J., on December 1, 2, 3, 1913. Applications must be filed at least ten days prior to date set for examination.

After January 1st, 1914, all applicants for a license to practice dentistry in New Jersey "shall present to said Board a certificate from the Superintendent of Public Instruction showing that before entering a dental college, he or she had obtained an academic education consisting of a four years' course of study in an approved public or private high school, or the equivalent thereof."

Also, after January 1st, 1914, a Bridge, consisting of three or more teeth exclusive of abutments, and one Richmond Crown, will be required as a practical test in Prosthetic Dentistry, in place of a full set of teeth soldered upon a gold or coin silver plate hitherto required.

For further particulars, apply to Alphonse Irwin, D.D.S., Sec'y., 425 Cooper Street, Camden, N. J.

## Pennsylvania Board of Dental Examiners

The next regular examination of the Pennsylvania Board of Dental Examiners will be held in Pittsburgh and Philadelphia on Wednesday, Thursday, Friday and Saturday, December 10, 11, 12 and 13, 1913. Application papers can be secured from the Department of Public Instruction, Harrisburg. For further information address the secretary.

ALEXANDER H. REYNOLDS, *Secretary.*
4630 Chester Ave., Philadelphia.

## The Idaho State Board of Dental Examiners

The Idaho State Board of Dental Examiners will meet in Boise, Monday, Jan. 5, 1914, at 9 A. M. The meeting will be held at the State Capitol Building. ALBERT A. JESSUP, D.D.S., *Sec'y.*

## National Dental Association Advances Date of 1914 Meeting One Week

At the urgent request of the Local Committee of Arrangements at Rochester, the Trustees of the National Dental Association have advanced the date of the next meeting one week; therefore, the 18th Annual Session will be held in Rochester, N. Y., July 7, 8, 9 and 10, instead of July 14, 15, 16, and 17, as originally selected. The officers, the local committee and all other committees are going to put forth every effort to make this meeting, which is the first under the reorganization, the best in the history of the Association and we feel confident that our increased membership and interest in our Association will prove a decided advantage in many ways.

HOMER C. BROWN, *President.*
Columbus, Ohio.
OTTO U. KING, *Gen. Sec'y.*
Huntington, Ind.

## Institute of Dental Pedagogics

The next Annual Meeting of the Institute of Dental Pedagogics will be held in Buffalo, N. Y., January 27, 28, 29, 1914. The Executive Committee is planning to present an exceptionally interesting program which no dental teacher can afford to miss.

J. F. BIDDLE, *Sec'y.*,
Pittsburgh, Pa.

## Back Copies of the Proceedings of the National Dental Association

There are a few copies of the '07, '08, '09, '10 and '11 "Transactions of the National Dental Association" in the possession of Dr. Arthur Melendy. These copies, while they last, may be secured by libraries and other educational institutions and members of the N. D. A. by sending thirty cents per copy (to cover postage) to Dr. Arthur R. Melendy, Holston Bank Bldg., Knoxville, Tenn.

OTTO U. KING, *General Secretary,*
Huntington, Ind.

## Ohio State Dental Society

The forty-eighth annual session of the Ohio State Dental Society will be held in Memorial Hall, Toledo, Dec. 2, 3, and 4, 1913.

Through an error in the October number of the Summary, the meeting place was stated as being the Hotel Secor; please note the correction.

A reading of the program as it appears elsewhere will indicate a program such as is seldom offered and it is confidently expected that this will be the greatest meeting of this Society ever held.

Mark off the dates, make your hotel reservations early and come.

F. R. Chapman, *Sec'y.*

## The Panama-Pacific Dental Congress.

The work of the Committee of Organization of the Panama-Pacific Dental Congress is rapidly assuming definite form, and the entire general plan of the Congress will shortly be announced.

The floor plans of the new Municipal Auditorium, in which the Congress will meet, will be sent to all prospective exhibitors within the next thirty days. The exhibits will be held in the main hall of the Auditorium, a room 190 feet square, affording ample space and light, and from present indications, all of this great area will be fully occupied. It is planned to make these exhibits and their accompanying clinics, one of the great features of the Congress, and they will, aside from the general program, afford a liberal education to any one interested in modern dentistry.

Space in the Auditorium has been reserved for the general sessions of the Congress, and for the meeting of its sections, and also for the dental societies and fraternities which will meet in San Francisco during the Congress.

Three hundred thousand gum stickers bearing the seal and date of the Congress will shortly be placed in the hands of dental dealers throughout the country, and every dentist who receives goods or letters from them, will in this way be reminded that it is time to prepare for a trip to San Francisco in August of 1915, to attend the Panama-Pacific Dental Congress, and the Panama-Pacific International Exposition.

Your duty is to yourself and those about you. If you are despondent, pessimistic and dyspeptic, you radiate your feelings to all with whom you come in contact. It is a crime against yourself and your fellows. Forget it, or retire to solitude.

THE DENTAL SUMMARY

The Magazine That Helps

Vol. XXXIII DECEMBER, 1913 No. 12

OFFICIAL ORGAN

The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

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# REGULAR CONTRIBUTIONS

## THE BEGINNING OF DISEASES OF THE PERIDENTAL MEMBRANE AND THEIR TREATMENT*

BY ARTHUR D. BLACK, D.D.S., CHICAGO, ILL.

I HAVE BEEN ESPECIALLY INTERESTED during the past few years in studying certain pathological conditions of the peridental membrane from two different viewpoints: one, the relationship which diseases of this membrane bear to general systemic conditions, and to other local lesions in the body; second, the etiology of the diseased conditions of the peridental membrane. I will on this occasion pay particular attention to some of the causes and their prevention.

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*A talk before the Indiana State Dental Society, 1913.

I want, first of all, to emphasize what Dr. Price has said relative to our duty as dentists toward this question of research. We have been placed in a rather embarrassing position by the medical profession, inasmuch as we seem to have allowed our sister profession to precede us in the study of the relationship of mouth conditions to general systemic conditions. In this field we should have preceded the medical profession by many, many years, yet men in medical research laboratories have done much in recent years in the study of pathological conditions in the dental field. A few dentists have done a little, but the fact remains that, as a profession, we have not been as active in these matters as we should have been.

Today we are studying preventive measures, and we will first present something of the etiology and early pathology of the diseases of the peridental membrane and later offer suggestions for their treatment.

In all medicine etiological and pathological factors necessarily become the basis of treatment. At first almost any disease we might mention is treated for the symptoms only; as our knowledge of the pathology becomes clearer we change the treatment accordingly, until, with a full knowledge of etiology and pathology, we may be able to apply preventive treatment. I think we will all agree that the more we know of a disease, the better will we be able to cope with it both in the matter of treatment and prevention. The establishment of the fact that the mosquito infects the human with yellow fever, mentioned by Dr. Price, and the resulting eradication of this disease in many districts by preventing the development of the mosquito, is a striking case in example.

There has always been in the dental profession a peculiar lack of association of our knowledge of pathology and our treatment. This statement applies not only to our treatment of lesions of the soft tissues of the mouth, but to the hard tissues as well. It is with a purpose of inducing you to look more carefully into the pathology of some conditions presenting in the mouth and to urge you to apply such knowledge of pathology in your treatment, that I am here today.

I have made a fairly careful review of the literature as presented in our dental journals and dental books, upon the diseases of the peridental membrane, and if you will do so, you will find hundreds of articles in which the principal question discussed is whether these diseases are of local or constitutional origin; and the consensus of opinion seems to be that the cause is sometimes local, sometimes constitutional. sometimes both, and that does not help us much. We are all pretty well agreed that the present treatment of these diseases is not satisfactory, either to our patients or to ourselves. We all recognize the fact that there is an increasing number of persons affected with these lesions and that the time has come when we must pursue a more promising line of treatment than any thus far attempted.

Let us for a moment consider briefly something of the histology and physiological functions of these tissues. The peridental membrane is attached to the tooth root by the building of cementum about the ends of the fibers. The cementum is built by specialized cells—cementoblasts—which are found in the peridental membrane. Peridental membrane differs from other tissue by having these special fibers arranged in groups for special purposes, and by having the specialized cells which build cementum. What are the possibilities of repair of this tissue when it is injured? That naturally depends upon the character of the injury. If a sharp, sterile instrument is carried through the tissue alongside the root, there will usually occur healing by primary union, the same as in other soft tissue. On the other hand, if a tooth is extracted, both the fibers and the cementoblasts disappear by absorption. Likewise the same thing happens if there is an injury which separates a few of the fibers for a considerable time; as a result of the long detachment, or infection, or both, the cementoblasts of the area disappear, as do also the fibers of the peridental membrane. In such position there remains gum tissue without those special cells and fibers which are necessary for the attachment of the tissue to the root. We can, therefore, hardly expect that a reattachment will occur under the most favorable conditions of asepsis.

I want to call attention to an extremely important etiological factor in the diseases of the peridental membrane, and that is that there are but two points of beginning of these diseases; the one at the apex of the root following the death of the pulp, the other at the gingival line of the tooth, following a gingivitis. This latter inflammation begins in the free gingivae, a tissue overlying the enamel and only indirectly attached to the cementum, and gradually extends until the peridental membrane is involved. The exceptions to the above points of beginning would be through some unusual traumatic lesion, which we may exclude for our present purpose.

We have not associated as we should this preliminary gingivitis with the subsequent destruction of the peridental membrane, or if some of us have recognized the relationship between the two conditions, we have not intelligently treated them; in fact, we have usually failed to treat the gingivitis at all. We must have a gingivitis preceding the detachment of the peridental membrane, then why not treat the gingivitis which can usually be cured? Why do we wait until the detachment of the peridental membrane has occurred; until the disease has progressed to the point where there does not remain within the tissue those cells which are necessary for restoration?

The two most common local causes of gingivitis are deposits of calculus, and irritations or traumatisms resulting from bad margins of fillings or crowns, or from various conditions which permit the impaction of food between the teeth. It is this last group of conditions to which I wish to call particular attention. If we make careful examinations, we will very often notice inflamed areas caused by bad margins of fillings or crowns, and in each particular case there is little difficulty to determine what should be done. Rough margins should be trimmed smooth whenever that is possible, fillings should be partly or entirely removed and replaced if necessary, crowns should be trimmed or replaced, oftentimes with bands which do not impinge on the gums or possibly without bands. We should do whatever is necessary to remove the cause of the inflammation.

In those cases in which there is impaction of food between the teeth, the causes are much varied. In many cases there is a slight separation of two teeth, due to some abnormality in the occlusion, or to the extraction of a neighboring tooth. The separation is enough to allow food to be crowded past the points which should be in contact, and yet the teeth are sufficiently close together so that the food debris will be held between the teeth. This debris presses on the interproximal gum septum, causing it to be first inflamed and later absorbed.

I cannot better illustrate these conditions than to refer to a number of cases. First, here is a patient, a man of forty-five years, with a slightly open contact, such as I have just mentioned, between two lower right bicuspids. Neither tooth is decayed, but food is crowded between them at each meal and the patient scarcely ever sits through a meal without finding it necessary to free the space by using a toothpick. Both the impacted food and the toothpick injure the interproximal gingivae, and it is often slightly uncomfortable for an hour or more after a meal. On examination, a very slight swelling and redness are noticed: the crest is not as high as it should be. The teeth look to be in contact, but a silk floss may be passed freely through the space from occlusal to gingival, showing that the teeth are not in contact, but have separated a little.

This is a case of gingivitis. The patient states that it has bothered him for several years and he has on at least half a dozen occasions complained to his dentist and has as many times been told that there was no decay and no filling or treatment was necessary. If we should follow such a case for many years, we would find that eventually the interproximal gum septum would be gradually absorbed and the peridental membrane would become involved, either by being forced from its attachment to one or both roots, or by a pyogenic infection, or both, and a case of pyorrhea would be established.

Something should be done at once to restore that contact. We should first determine, if possible, why the separation occurred. In this case we find a mesio-occlusal amalgam filling in the first molar, which did not fully restore the contour of the tooth, and the occlusion was such as to force the second biscupid distally into contact with the flat amalgam filling. The proper treatment was to remove the filling and by using a matrix and mechanical separator (Perry), replace it with a filling of proper form which would hold the bicuspids in proper contact. Within a week the inflammation of the gum between the bicuspids had disappeared. The gingivitis was cured.

Another case is one in which there was an open contact between the upper left cuspid and the first bicuspid. The progress was farther advanced. While a portion of the gum septum remained, food debris had been forced between the septum and the distal side of the cuspid root. This had continued until the peridental membrane had been pushed away from the root, forming a pocket about three millimeters in depth. The case represents what would have been a stage farther in the progress of the previous case, had it not received treatment.

Another case presents in which there had been placed several years previously a flat amalgam filling in the mesial of an upper first molar. This filling did not make contact with the second bicuspid, and food wedged between. Now, instead of an interproximal gum septum, there is a depression of the soft tissue and the proximal surfaces of both roots are exposed for three or four millimeters Some decomposed food debris may be removed with an explorer. The tissue bleeds freely.

Still another case presents in which there is an unusually broad contact between the upper left first and second molars, neither of which is decayed. This patient is fifty years old and there is considerable wear of the proximal surfaces from slight bucco-lingual movement. Food has packed in this interproximal space also, and the gum septum has not only been destroyed, but a little drop of pus may be pressed out. This case has become infected and it is a case of pyorrhea. May I impress the fact that these cases, although having slightly different causes, serve to represent different stages in the progress of the pathological process of all of them. There is first a gingivitis, exhibiting a little redness and swelling, next an absorption, then an involvement of the peridental membrane, finally an infection, and we all know the rest. All of these cases could have been cured as easily as was the first one, had treatment been instituted before the peridental membrane became detached, whereas there is little chance of a cure after detachment has occurred. Are we not justified in urging the necessity of treating the gingivitis and thereby preventing involvement of the peridental membrane?

Similar cases might be cited by the hour, many of which present numerous areas of inflammation in various stages of progress. It is not unusual to see a mouth in which there is not a single normal contact between the bicuspid and molar teeth. I have seen a number of such cases in which the patients have suffered severely from pain in attempting to chew their food and have endured much discomfort until the impacted food could be removed. In the light of our present knowledge of these conditions, some such cases are little short of malpractice.

All patients do not suffer from pain as a result of the impaction of food between the teeth. In fact, there seems to be the greatest possible variation, some complaining of severe pain with the slightest crowding of food between the teeth; others contending that they have felt no discomfort when a dozen spaces are filled with food debris. Regardless of complaint by the patient, our duty in all these cases is the same—to do whatever is necessary to prevent further impaction.

In order to learn something of the conditions which actually exist in the mouths of our patients, about a year ago I asked a number of dentists in various sections of the country to make careful examinations of the gingivae of a number of their patients. For this purpose, I furnished them with cards printed with special diagrams, and accompanied by careful instructions, so that the records would be as nearly uniform as possible. Each examiner was requested to report areas of gingivitis, with the cause. This was done by a system of numbers representing the various causes. Especial attention was called to the fact that reports of cases of pyorrhea were not desired because we wanted to get some idea of the percentage of persons who had areas of gingivitis, to show the possibilities of preventing pyorrhea by giving proper treatment for gingivitis.

I will quote the following from my report of these examinations, as read before the Chicago Dental Society:*

> I would like to emphasize the fact that I have set aside the records of all mouths having pyorrhea, and will, therefore, present records of the examinations of the mouths of patients who have not pyorrhea. I have also eliminated the cards of all persons younger than 20 years or older than 35 years.
>
> After tabulating all the data collected, the following is presented as a summary of conditions recorded. This covers 376 persons, ages from 20 to 35 years, inclusive, average age 26¼. Of the 376 there were but 19 in which no area of gingivitis was found and of this 19 there were 5 who had open contacts, though no inflammation at the time of the examination. To state it differently, about 95% of all persons examined had at the time one or more areas of gingivitis; were started on the way toward peridental disease. Most of these mouths were in what would ordinarily be said to be good condition, except for carious cavities. There were but 7 marked for a general lack of cleanliness; 37 others were marked for lack of care of certain areas, these areas averaging about 4¼ teeth to the patient. In the mouths of the 357 persons who had gingivitis, 3,050 areas of inflammation were noted, an average of over 8.5 per person. Is it any wonder that there are so many cases of serious disease of the peridental membrane when we find such conditions in the mouths of those people who are themselves taking reasonably good care of their teeth and who are supposedly receiving good dental service? The 3,050 areas of inflammation may be classified as follows:
>
> 783 areas due to deposits of salivary calculus. These were in the mouths of 133 persons, and the deposits were on the various surfaces of 660 different teeth. It will be noted that there were few instances in which more than one area about a single tooth was recorded as being inflamed. This is an average of 5.8 areas per person, of those who had deposits, and an average of 5 teeth for each of these mouths. Of all persons included in the tabulations, this is an average of 2.08 areas per person.
>
> 447 areas associated with deposits of serumal calculus. These were in the mouths of 55 persons, and the deposits were on the various surfaces of 320 teeth. This is an average of 8

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*See *Dental Review*, Sept., 1912.

areas per person of those who had these deposits, or an average of 5.8 teeth for each of these mouths. Of all persons included in the tabulations, this is an average of 1.18 areas per person.

Of those having deposits of salivary or serumal calculus, 25 persons had both, making a total of 163 persons who had deposits of either kind or both. This leaves 213 of the total number examined who had no deposits.

1,820 areas of inflammation due to other causes than calculus, subdivided as follows: 663 to bad margins of fillings or crowns, 421 to lack of contact with proximal fillings or crowns, 314 to improper contacts of proximal fillings or crowns, 180 to malposition or atypical forms of proximal surfaces of teeth, 174 to lack of contact of teeth having no decay of the proximal surfaces, 155 to caries of proximal surfaces and 13 to worn contacts. Of this total of 1,820, over seventy-six per cent., or 1,398, may be charged to lack of care or poor technic in operative procedures. A considerable portion of the remaining twenty-four per cent. are cases which are generally neglected, such as those in which there is a gingivitis caused by improper contact or atypical forms of teeth which are not decayed, also many of those in which the teeth are not quite in contact and not decayed. I think we might reasonably charge very nearly 95% of all of this group of cases to lack of care or neglect on the part of the dentist.

For all persons included in the tabulations, there is an average of 4.84 areas of gingivitis due to improper contacts, bad margins, etc., per person. Please compare this with the average of 2.08 areas per person for salivary calculus and 1.18 areas per person for serumal deposits. It should be remembered that many of the areas of serumal deposit are due to irritations of bad margins of fillings and bad contacts.

From similar tabulations made for a considerable number of older people, it may be stated that the average number of all the conditions is greater and the percentage of cases of detachment of the peridental membrane is very much greater for persons over 35 years of age.

In closing, I wish to call attention to the fact that the very large majority of all cases of gingivitis can be cured by extremely simple methods, so simple that I fear many of us think it not worth while. If each of you will bring yourself to realize as you see and treat cases of pyorrhea, that each and every such case was at one time, maybe many years before, a simple case of gingivitis, and that the now incurable case of pyorrhea could have been easily prevented by very simple treatment at the proper time, then maybe you will also come to realize that the case of gingivitis which presents tomorrow is very apt to become a case of pyorrhea within a few years unless you take measures now to prevent it. The fact that years usually elapse between the initial gingivitis and the definite case of pyorrhea has in large measure kept us from properly associating the two, yet we must recognize the relationship and apply treatment early when it will be effective in restoring the tissues to normal. It seems to me that this is a very simple, rational proposition, which should appeal to all of us and that each of us should see to it that the areas of gingivitis presenting in the mouths of our patients receive very careful consideration and treatment. Thus will each of us do our part in the prevention of pyorrhea.

## DISCUSSION.

Dr. H. C. Sexton, Shelbyville: The essayist has left but few things to be added, and I want to compliment him—and thank him. I think, however, that he has left out the real important suggestion. I think some of the periosteal difficulties commence before the baby is born. We should instruct the mother to take care of the child's mouth so that when the permanent teeth are erupted, they may come in proper alignment, and therefore have a good cushion for the occlusion of the teeth that the peridental membrane starts from. If we have normal action, we will have few diseases of the peridental membrane, if the mother has been told to instruct the child. There is one point the speaker failed to bring out, and that is the shape of teeth at the gingival margin. I wish I had the picture to show you—if the tooth is flat at that point, you may have gingivitis, inflammation, and in finishing your fillings you should keep this in mind, that the cervical border of your filling cannot receive too much care and attention. Many shell-crowns overlap the cervical border. A shell-crown is capable of hiding a lot of poor dentistry. Make as few of them as possible.

Dr. Chas. A. Priest, Marion, Ind.: I am not going to say very much, but one or two points have arrested my attention. Dr Black says we know but little of the etiology of our subject, and indicates that investigation should be made, speaking of the necessity of original research, and I thought that came in very pat. Another thing is stated: that gingivitis is curable but pyorrhea not. A little boy in Holland stood for hours stopping a small hole in the great dyke, by thrusting in his finger, until his cries brought help. But that trifling beginning of a leak would have become an inrushing flood, such as no earthly power could have coped with, had the boy allowed the water to get even a momentary start. So it is in our treatment of pyorrhea; if we can get at our cases while they are still only gingivitis, we can cure them. Another matter Dr. Black mentions—he found out that in about fifty per cent. of cases of gingivitis there were no deposits. To me that seems remarkable. The first thing I always look for is deposits about the necks of teeth. My eyes have been opened.

Dr. Black (closing): I want to second what Dr. Priest has said concerning the necessity of our recognizing the beginnings of these lesions which through neglect result so disastrously. I am not going to insist on your getting quite so far back as to the unborn babe, however, if we can anticipate these unfavorable conditions in the mouths of the generation already on the stage of life; can restore normal conditions where through oversight they have gained a start, that seems to me all we can reasonably expect of the profession. If we fail to see our cases early, we fail to cure them. Many of these claims for a cure of advanced cases remind me of the story of the old veterinary doctor who sent a bill for treatments of a cow that died, and the item in the bill read: "To curing your cow until she died."

> Man owes his growth, his energy, chiefly to that striving of the will that conflicts with difficulty, which we call effort. Easy, pleasant work does not make robust minds, does not give men a consciousness of their powers, does not train them to endurance, to perseverance, to steady force of will, that force without which all other acquisitions avail nothing—*William Ellery Channing.*

# SHALL WE CONTINUE TO USE THE BANDED CROWN?

BY S. MARSHALL WEAVER, D.D.S., CLEVELAND, O.

IN THESE REMARKS it will be necessary to adhere closely to the subject, not considering general crown and bridgework, which is almost inexhaustible.

The discussion to follow will be relative to single crowns and stationary or fixed bridge work, when porcelain faced crowns are desired for abutments on the six anterior teeth.

The selection of this subject is the result of observations of about seven years' practice with this particular line of work, the one of most interest to the writer.

It has been observed that nearly every crown if fitted with band, which was properly concealed by the gum on the labial aspect, would in a short time cause a recession and a decidedly unhealthy condition of the gingivae, no matter how perfectly the work had been performed. It was also noticed that on properly fitted Logan, Davis and similar crowns when bands were not used, there was a perfectly normal condition of the gum, and a beautiful lifelike appearance of the tooth, caused by the surrounding tissue being of the normal color instead of that ugly, dark congested appearance so much in evidence around the crown which carries a band, immediately branding it to the observer as a *false tooth.*

Is it more than a simple conclusion after these observations that we should profit by a study of such conditions? If we did not come to some solution of the problem and suggest a remedy for this injurious condition we would not be doing for humanity what we profess when we have D. D. S. attached to our names.

The first method in use was the bandless crown imperfectly adapted to the surface of the root and held by a threaded gold wire or a wooden peg. At this time they had no medium to close up the space intervening between root and crown. The life of this crown was very short. About 1879 Dr. Richmond brought out the banded crown as we have it today.

This seemed at first to fill all requirements, but after a time the irritation caused by the band set up such violent inflammation that other methods were sought, and the Morrison style of crown came into use. This overcame the irritation of the gums, but was not sufficiently strong.

Later various crowns such as the Logan, Davis, Justi, White and others were given to the profession. These crowns came in two distinct classes; the fixed and the detachable pin. For the former I have no use whatever, as the latter has all the advantages and none of the disadvantages.

Within the last four years I have found only two cases in which banding seemed advisable. One of these was a fractured root, caused by a blow, and the other a root which had been open for several years and all that remained was the shell leaving a knife edge to fit the crown against, but when the band was used it gave sufficient resistance to make a fairly strong tooth. These, I might say, were exceptions to the rule.

First of all, I want to ask the question, what do you use the band for?

A good many will answer: "To keep the root from splitting and get the full resistance of the root against the force of mastication." Others will say: "To seal the joint between the root and crown, so the cement will not wash out."

Taking these reasons into consideration we will try to analyze them and see what conclusion we reach.

How many *split* roots do you encounter in a year compared with the number of teeth *ruined* by the *criminal use of bands*, and if the roots are split, do you know how it was done? Did it ever occur to you that most of the anterior roots are split labio-lingually, a thing almost impossible to occur from any leverage brought to bear against the lingual side of the crown?

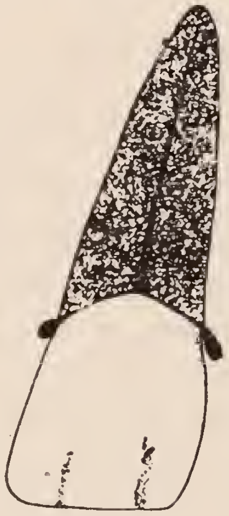

Fig. 1

Now then, what caused these roots to split labio-lingually? Was it a round pin that fitted the post hole too tight, a method practiced by some, which does not allow the cement to escape, and by hydraulic pressure fractures the root while the operator is trying to force the crown to its proper position? Or was the cement too stiff and a mallet used to force the crown on, or, not knowing when the crown was in place, by additional malleting was the wedge-shape crown driven into the V-shaped end of the root, fracturing it by simple mechanical force? See Fig. 1 in which the colored portion represents the fracture in the root.

Some operators ream out the root till it resembles half of a cocoanut shell, thinking, for some unknown reason, it might make the fitting of the crown easier.

The V-shaped face of the root mesio-distally is a necessity owing to the line of the *gingival attachment* which should be followed in grinding off the end of the root preparatory to crowning.

In the proper preparation of a root the tooth should be ground off to a point just under the free margin of the gum following the gingival line, care being taken not to injure the gingival attachment, if it can possibly be avoided, as this is one of the causes of receding gums which may ultimately cause a partial or complete *denuding* of the root.

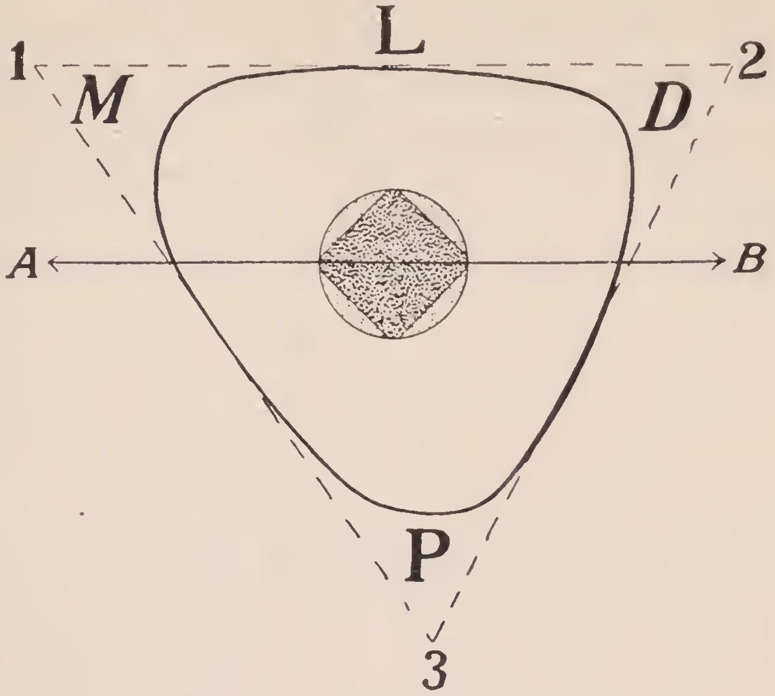

Fig. 2

It will now be necessary to go into the general shape of a tooth and see where the force of mastication is transmitted to the root and where the leverage is applied. By studying Fig. 2, which represents a cross section of a central incisor, we will note that nature in shaping this tooth has put about three-fifths of the bulk of the root anterior to the line A B drawn through the center of the pulp chamber. This would be the portion of the root that would theoretically receive the strain, and A B would represent the probable line of fracture due to mastication. You will also notice that the remaining lingual portion below the line A B is of such

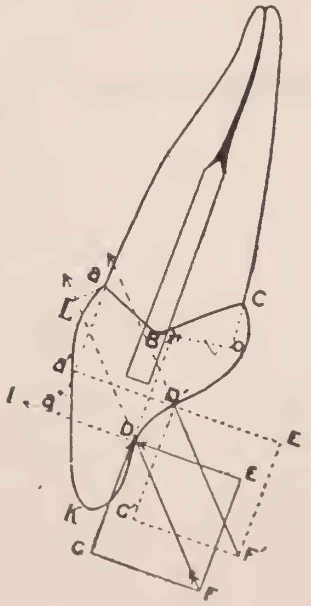

Fig. 3

shape that it would not draw any of the hard tissue along with it causing any backward pull on that two-fifths of the root; more than the attachment of the peridental membrane. Now is it probable under these conditions to split the root? Again, let us consider the longitudinal section. Fig. 3. Let A B C represent the receiving end of the root properly shaped as previously described. During the process of mastication a force is exerted on the crown represented by F D.

Before considering the action of the transmitted force of mastication, let me explain the action of a force acting in a somewhat similar manner upon a block of wood (B) Fig. 4, resting upon a table (T). Let us consider that there is a force acting upon the side of the block tending to tip the block over. Such a force may be represented in magnitude and direction by the length (to some arbitrary scale) and direction of the arrow FD. This angle is slightly exaggerated for sake of demonstration. Now it is evident that if a force equal in amount to our force F D but acting at the top of the block and downward as F D′ ′ instead of in the direction F D that there would be no tendency for the block to be tipped over. Again, if a force equal to F D and to F′ D′ acted as does the force ″F D″ ′ at the point D″ ′ at right angles to the axis D′ N of the block, the tendency to tipping is greatest, that is to say, that a given force will produce the greatest tendency to tipping over the block if it acts at right angles to the axis of the block, and with the least tendency if in line with that axis as it is when at F′ D′. In fact F′ D′ exerts no tendency whatever toward tipping over the block other than to diminish the action of F D to the extent of its relative length.

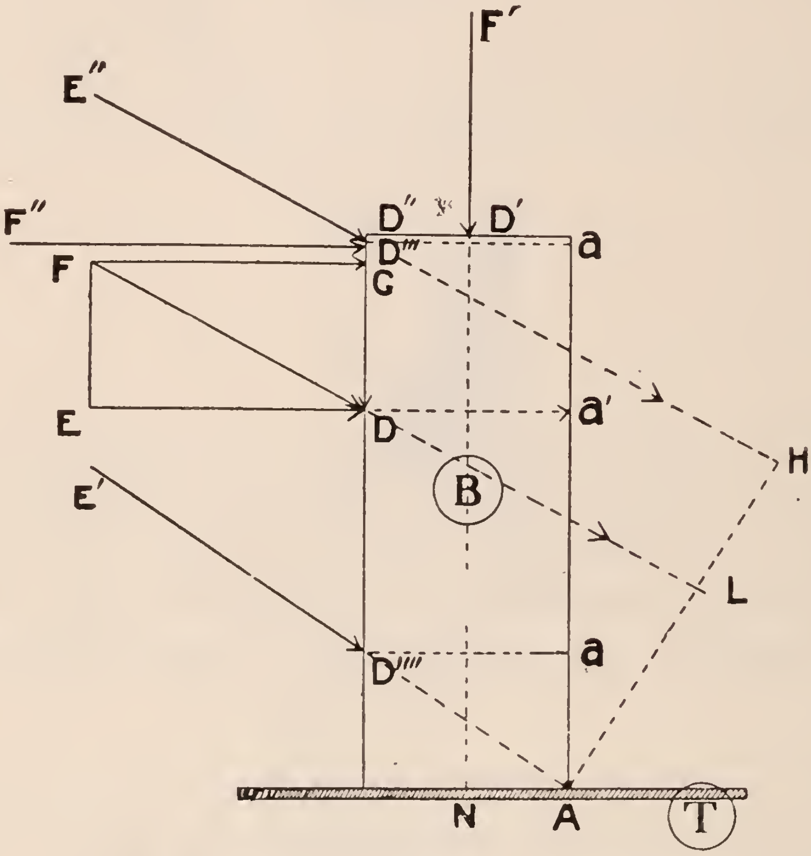

Fig. 4

If we are considering a force such as F D acting neither in line with nor at right angles to the axis of the block—and we desire to determine how that force is acting in these two ways, it is necessary to resolve the given force into two component forces which acting together will produce the same result as the single force F D—one D G in line with the axis and the other E D at right angles to it. This resolution, as it is called, of a single force into components, is a directly opposite process from the combining of two forces into one by the method of the parallelogram of forces. It is evident that of the two component forces one G D acts to hold the block on the table and the other E D tends to tip it over.

Hence, to find the tendency a force acting at any angle on the surface of a body may have to cause a tipping of that body it is necessary to find the component force acting at right angles to the axis, which may be tipped over if the force is great enough.

Further, if the force acted at D'' instead of at D the tendency to tip would be greater, and if at D'''' the tendency to tipping would evidently be zero. By a law of mechanics the relative tendency is as the distance of the point of contact of the force from the table. This is simply because the force is acting at a great leverage, for example, let the force F D=10 lbs. and the moment (A L) be one-half inch in length, then the tipping force would be 10x½=5 lbs.

Now let us consider diagram 3, which is similar to Fig. 4, with reference to the action of the transmitted force F D. Instead of the block of wood on a table we have a crown *fastened* to the end of a root.

This *transmitted force* of mastication represented by F D may be resolved into two component forces. the normal one at right angles to the surface of the tooth represented by E D and the tangential G D acting directly against the end of the root: this tends to hold the crown in place, and resists the tipping tendency, while E D tends to push or tip the crown on its fulcrum A. Whenever one force acting on a rigid body is equivalent to two or more forces it is called their resultant, and they are called its components.

The amount of tipping force is governed by the position on the lingual surface C K of the point where the force F D is applied as D or D'. This tipping force E D varies directly with the length of the *moment* A L a line drawn at right angles from the projected line of force F D to the fulcrum A. Algebraically expressed (tipping force=Force lbs. x length in inches of A L). If F D=100 lbs. and A L=⅛ of an inch the tipping force would be 100 x ⅛=12½ lbs. of tipping force.

If the given force F D acted *at* D' instead of at D the tendency to tipping would be negative as shown by the projection of F' D' falling back of the fulcrum A which immediately starts a tipping force in the opposite direction.

Now the question is, what force is necessary to counteract this outward motion E D?

If we had not considered carefully the laws governing motion the band would seem to be the solution, but when the transmitted pressure is applied in the direction F D *if* there is motion of the crown the fulcrum immediately establishes itself at A.

When the root is properly shaped for bandless crowns, the lingual bevel of the root C B Fig. (3) renders it impossible for the crown to be shoved bodily forward *provided the post does not bend, stretch or loosen* at either end.

Looking at Figs. 5 and 6, 5 shows the crown in place, and 6 the only position the crown can take under the force of mastication, showing that the band is pulled directly off the root, *if any motion occurs,* instead of being pressed against it as generally believed. I have but two remedies for the correction of this evil, first the *proper shaping* of the *root,* and second the *proper* shape and size of pin.

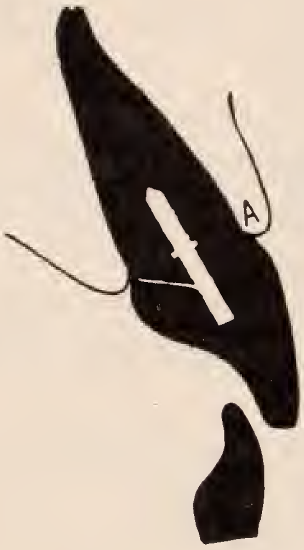

Fig. 5

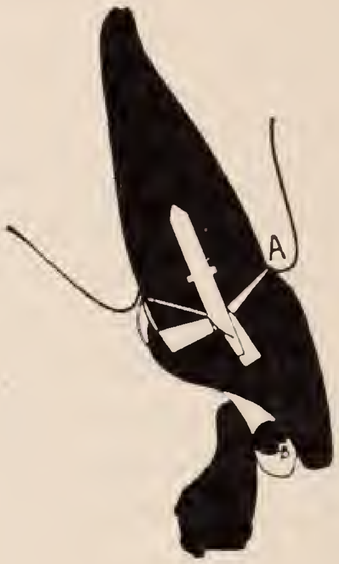

Fig.6

Nearly every failure within my observation has been due to dowel pins too small both in diameter and length, usually the former.

Many operators seem to think if they can get the pin to the apex of the tooth the diameter is immaterial. Consequently we find many posts resembling hat pins in proportions.

The requirements of a good post is *rigidity sufficient to withstand all strain and square* in shape.

Pure platinum should never be used. Iridio-platinum answers all purposes.

Logan crowns demonstrate the failure of pure platinum by the many open joints we encounter in every day practice.

If the pin is *not ductile* under the force of mastication, and has sufficient *roughness* to keep it from being pulled out of the cement either in the root or porcelain, and *rigid* enough so it can not be bent, there can be *no possible opening of the joint.* This I want to impress as the *most important factor in crown construction,* and the mission of this paper.

Taking into consideration the different methods of getting adaptation to the root such as the burnishing of a platinum or gold floor and filling in with porcelain or gold, the use of thin articulating paper and also the new mouldable porcelain, all familiar methods, it seems hardly necessary to say that any man who cannot get a perfect joint had better practice in the laboratory until he can. It is not a case of whether he *can,* but whether he will take the *pains.*

The half band, in my judgment, is nearly as injurious as the ferrule, because it encroaches on the interproximal space causing irritation at the most vital point of the gingivae. How many dentists would countenance the practice of allowing approximal gold fillings to extend into the proximal space similar to a band and call it good practice?

One point of great importance is the preparation of the post hole. This should be carefully done after the crown has been selected, as the pin holes in the crowns vary slightly. This variation can be accommodated very nicely by reaming out the pulp chamber to suit the crown.

A round bur should never be used as a reamer. A twist drill answers the purpose very well. The pin should be made of square wire, usually No. 14 gauge, with the sharp edges slightly rounded and sized so it will fit tight into the root and crown. This prevents any rocking motion and facilitates the grinding as the crown goes to the *same* position *every time,* a thing *impossible* if the pin does not fit the root and crown snugly.

Now, why should we use a square pin? *First,* because we get more strength for the given amount of material than in a round pin, *if* the diagonal of the pin is placed labio-lingually, Fig. 2. *Second,* the cement has four ways of egress, which insures the crown of easy adjustment in setting and obviates any possibility of hydraulic splitting.

The lack of restoration of the lingual lobe is also a cause for much irritation. In most ready-made crowns this point should be restored and many times exaggerated by baking on additional porcelain after the crown has been articulated. To get the right tip to the crown it is invariably necessary to grind off this important part of the tooth which nature has given for the express purpose of diverting the hard food stuffs away from the gingivae, thus preventing injury to this tissue.

When setting a crown with cement I always use a jiffy cement tube which insures the perfect filling of the root, thus excluding air bubbles.

Another important point for the operator who is afraid of having leaky joints is the use of Evans gutta percha cement, a substance which if properly used will not wash out, and is of great advantage if the crown or bridge has to be removed, which is often advantageous in filling adjacent teeth. The pin is supposed to be rigid enough so it cannot bend or stretch. Referring to Fig. 3, I contend that the incline plane C B, or hypothenuse of the triangle C B O answers the same purpose as a band the length of CO for exactly the same *amount of tooth* is in front of and resisting the same amount of force as though the pressure were exerted on the leg C O of the same triangle.

There are probably many points of interest left out in trying to cover the subject in so short an article.

I wish to voice Dr. George Evans in his latest work wherein he states: "Modern artificial crown and bridge belongs to the department of dentistry formerly termed mechanical, but the judgment, skill and scientific information required places it far above ordinary mechanical dentistry, which has sunk to a low estate since the introduction of vulcanite. I regret exceedingly that so important a branch of dentistry has been overshadowed by porcelain and gold inlay work."

Much of this lack of progress I attribute to the dental laboratories, not wishing to put one bit of discredit on them, but on the dentist who seems to think the laboratory man can perform miracles and all he has to do is to send a photograph of the patient's grandfather and write careful instructions on the back to please make a Richmond crown for the left upper incisor, shade to suit a lady twenty-seven years old.

## THE THREE-POINT CONTACT

BY DR. L. P. HASKELL, CHICAGO

Do those who so strenuously advocate the "three-point contact" system wear artificial dentures? I imagine not, for unless the conditions are very favorable they would realize that the system is not necessary.

Take, for example, the case of a full upper denture, where the lower posterior teeth are so commonly shorter than the anterior teeth, what would the result be of a lateral movement of the jaw?

Then the case of a full upper denture, with high arch, good ridge, but with the numerous flat, narrow surfaces where absorption has occurred to such an extent that the lingual muscles are attached at the margins of the jaw, so the plate cannot be worn over the margin of the jaw. Imagine the result of a lateral movement, and these cases are, in my experience, innumerable.

Take a worse case, where not only the lower jaw is flat, but also the upper jaw is flat and ridgeless, so that a lateral movement is impossible. I can imagine that in some favorable conditions, as where both upper and lower jaws have good ridges, there would be no difficulty. But these cases, in my experience, are rare, and this is especially true of lower jaws, for in late years I have rarely seen a good ridge. This is especially true of my own jaw.

The fact is, in a vast majority of cases, the movement is up and down, and consequently no occasion for a three-point contact. I have no difficulty in masticating except with tough meat and crusts.

And yet one examining board compels the applicant to demonstrate the system.

# THE RESPONSIBILITY OF THE DENTIST AND PHYSICIAN IN REGARD TO MOUTH INFECTIONS*

BY THOMAS B. HARTZELL, D.M.D., M.D., MINNEAPOLIS, MINN.

THE HUMAN MOUTH is the largest portal through which infectious micro-organisms may enter the body. Almost all varieties of pathogenic bacteria have been found in the human mouth. The gastric juices afford little protection against them. Charles Mayo[1] says:

> Microscopic examination of gastric extracts made by Smithies from 2,406 different individuals with "stomach complaint" (dyspepsia, indigestion and the like) showed that irrespective of the degree of acidity of such gastric extracts, bacteria were present in 87 per cent. Morphologically cocci and diplococci were present in 83 per cent.; short and long rods (often of the colon group) in 58 per cent.; typical streptococci and staphylococci in 17 per cent., and *Leptothrix buccalis* in 24 per cent. In fifty-four cultural studies of saliva from "dyspeptic" patients, streptococci and staphylococci were demonstrated in over 80 per cent., bacilli in 66 per cent., and *Leptothrix buccalis* in more than 14 per cent. Comparing these figures it would appear that the common forms of pus-producing organisms (streptococci and staphylococci) have their proliferation retarded in gastric juice, but that bacilli (often of the colon group) as well as *Leptothrix buccalis* thrive in the stomach.

There is no protection to the organism where an actual lesion exists except that afforded by the leukocytes. The leukocytes in time are overcome in their efforts to oppose the destructive effects of micro-organisms. The almost universal presence of small lesions contiguous to the teeth which afford a foot-hold for pathogenic bacteria which by any chance gain entrance to the mouth, makes it doubly worth while to study the paths which the bacteria must travel to gain entrance into the circulation. A brief glance at the tissues in question will serve to accentuate the importance of a closer study of mouth infections.

## ANATOMIC AND PHYSIOLOGIC CONSIDERATION.

The teeth occupy sockets in the alveolar bone, which is built up around the teeth as they erupt. This bone is of a loose, porous character and has very thin edges; on the whole, an insecure frame-work to support the great stress of mastication, amounting to hundreds of thousands of pounds in the

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*Read in the section of Stomatology (A. M. A.) of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with *The Journal American Medical Association.*

[1] Mayo, Charles H.: Constitutional Disease Secondary to Local Infections, *The Journal American Medical Association.*

course of a year, which the teeth must bear. The teeth are suspended in their sockets by Sharpey's fibers, yellow elastic tissue, which is a ligament of suspension, plentifully supplied with blood through the alveolar process and also through the mucous membrane, the vessels dipping down into the ligament of suspension over the edge of the socket. In this membrane are resident certain glandular structures first described by Black. These glandular tissues are in direct continuity with vascular channels leading out into the mucous membrane and alveolar process. Therefore, any infectious material on the teeth themselves or accumulated between the teeth, at the free margin of the gum, has an uninterrupted avenue of entrance into the deeper structure of the jaw. The continuity of the vascular channels leading from the peridental membrane into the deeper structures is readily demonstrable by the injection of pure oxygen gas under the gum margin by means of a blunt-nosed needle. In this way one can trace these vascular channels through the alveolar process for considerable distances. Therefore, the pyorrhea pocket, which is an ulcerating infected surface full of micro-organisms, or the alveolar abscess, which usually occurs in the apex of the socket around the root-end, are both capable of introducing into the circulation the severest types of infection. If we bear in mind the conical nature of the tooth-sockets and the fact that the tapering roots filling these conical sockets support structures which in every twenty-four hours of the ordinary individual's life may bear a stress of from five to ten thousand pounds, one readily comprehends how infections in the peridental membrane or about the apices of the tooth's root are forced into the general circulation and lymphatic channels, leading from the teeth in their sockets. The direct lymphatic drainage of the tissues contiguous to the teeth is the most perfect in the whole body, affording direct access to the deeper structures of the neck, maxmilla and mediastinum, thereby making it possible for micro-organisms, introduced into the tissues through a pyorrhea pocket or apical abscess, to travel uninterruptedly into the deep structures of the body. Not only do the lymphatics afford direct access for micro-organisms to the circulation, but the rich plexus of blood-vessels supplying the peridental membrane and alveolar process invariably suffer from the destructive activity of pus-forming bacteria, opening the blood-vessels themselves to the entrance of germs which are injected into the broken ends of these vessels by the powerful stress of occlusion during the act of mastication, thus making the spread of bacteria in the circulation a certainty. The elastic nature of the peridental membrane makes it possible for the teeth to bear the shock of mastication for many years longer than they possibly could were they ankylosed into the bone. But this same elastic quality in the peridental membrane favors the introduction of infection. For, if there is infectious material around a root end, or about the side of a root in a conical socket, and a weight of from 10 to 250 pounds is applied to the occlusal end of such a tooth, the elastic quality of the membrane permits the tooth to sink down in its socket so that the root acts as a plunger, injecting the infectious material into the surrounding tissues.

The teeth themselves afford many square inches of surface for bacterial protection and growth, as they measure in a full denture about 20 linear inches in circumference, and, where destruction of the bony socket attains a depth of an eighth of an inch, we have the equivalent of 2½ square inches of cultural space beneath the gum margin. The necks of the teeth above the gum margin, protected from attrition by the bread bell-shaped occlusal portions of the teeth, afford easily from 2½ to 3 square inches more space on which bacteria may accumulate. This bacterial accumulation on the necks of the teeth is rarely noticed or appreciated, unless some special method of staining is adopted to reveal the presence of micro-organisms. If one desires to appreciate the enormous possibilities for bacterial growth on the necks of the teeth, one should apply a stain which will at once bring into view the bacterial coat always present on these surfaces.

## STAINING METHOD

The best disclosing stain for revealing bacterial presence on the tooth's surface is iodin, 45 grains, zinc iodid and potassium iodid, of each 15 grains, water and glycerin, of each 4 ounces.

A cotton sponge dipped into the disclosing stain and applied to the necks of the teeth instantly brings into view a heavy brown coat on the teeth, which, before the application of the stain is made, may seem white and clean.

I advise physicians and dentists who are in doubt as to the cause of the marginal inflammations of the gum and underlying bone to apply always the above disclosing stain, after which the mouth should be rinsed with water, which will leave in clear relief whatever bacterial coat the teeth may at that time bear. If this practice is followed, the observer will be impressed with the constant presence of areas of inflammation and deep pockets of destruction in the alveolar process and bone contiguous to the necks of those teeth which bear the heaviest bacterial coat.

## PATHOLOGY OF MOUTH INFECTION

The enormous surface for bacterial growth on the teeth and the protected areas between the teeth and the deep pockets which form in the presence of the heavy bacterial coat which these protected surfaces usually bear, give rise to a multitude of organisms, which of necessity pass into the stomach and bowels, and frequently alter, by their products and presence, the whole chemistry of digestion, so that an infected mouth may produce four distinct pathologic effects as follows:

1. That produced by the dissemination of bacteria through the medium of lymphatic drainage.
2. That produced by bacteria through the open blood vessel.

3. That damage sustained by the individual through the change in the chemistry of digestion caused by bacterial poisons.

4. That produced by a general bacteriemia which not infrequently is the result of the dissemination of bacteria in a blood-stream.

I would not contend for a moment that all the ills to which human flesh is heir may be traced to mouth infections, but I have observed many cases of general infection of different characters which have been traced directly to mouth infections. The ordinary mouth infection may result in the loss of the teeth only, and the general harm resulting from such infection may be only slight. Statistics gathered by me show that there is about one case in every ten in which severe constitutional lesions occur, lesions which are usually overlooked both by physician and dentist, traceable to the mouth. I present herewith the analysis of one thousand and twenty cases of mouth infections:

### SUMMARY OF FINDINGS IN 1,020 CASES OF MOUTH INFECTION

It is to be remembered that in the locality in which this experience has been gathered, the population is a young and vigorous one, as compared to the population of older countries, and the death-rate is lower per thousand on account of this fact. Here the proportion of aged people to people under 40 is much less than that of older localities. Of the one thousand patients observed, few were bed-ridden. In the following deductions, these facts were kept in view. Over half, or, to be accurate, 600 seemed to be absolutely healthy and normal in every way except in the matter of teeth and gums. Caries was more or less prominent in the whole number, and marginal infections, with a greater or less destruction of alveolar process, were common to all of them. There was no marked physical symptoms of ill health, aside from indigestion or mild forms of gastric irritation. As a rule on correction of the mouth infection, all these symptoms disappeared. Of the remaining four hundred, 300 gave evidence of more severe physical disturbances, though not severe enough to warrant sending them to a physician, or a more careful scrutiny of their habits of life than treatment of the mouth lesions and the proper rebuilding of the masticating mechanism. In the remaining 120 cases a great variety of physical ailments was observed, and physical examinations were made. The following lines of inquiry were noted and any facts which such inquiry elicited were tabulated: occupation, habits, general systemic condition, temperature, urinalysis, oral history, condition of the nose and throat, quality of the saliva, occlusion, the presence or absence of deposits on the teeth, and the character of such deposits, if present. Note was also made of undue stress, loss of function, prosthesis existing, and the prosthesis needed. The urinalysis involved a consideration of the total bulk of urine in twenty-four hours, its specific gravity, and examination for albumin, sugar, and a search for casts. The physical examination further sought to reveal or explain the systemic conditions which were found to exist in each individual case.

In eighty of these cases, the disturbance ranged over the entire alimentary tract, some patients being chronic sufferers from constipation, others from the opposite condition, namely, looseness of the bowels and diarrhea, all evidencing more or less malnutrition. Fifty had periodic and severe migraine, and the whole group suffered from more or less nervous irritation. Forty were of the extremely neurasthenic type. A considerable number of this group of 120 were also sufferers from chronic abscess. To be accurate, thirty-five had chronic apical abscess, and twenty had severe pericemental abscess as well. Sixty of them gave a history of rheumatoid pains, called by some of them neuralgia, by others rheumatism. In eighty cases, no kidney involvement or abnormal change in the urine was observed. Without exception all were benefited by treatment, showing a marked recession of constitutional symptoms on removal of abscessed and hopelessly loose teeth, and on surgical treatment of those teeth remaining which were worth treatment, followed by careful post-operative care of the mouth. Of the remaining forty cases, all showed greater or less kidney involvement, ranging from a trace of albumin to a considerable amount with casts. Ten showed the presence of sugar. Twenty showed specific gravity of urine ranging from 1.020 to 1.035. Twenty revealed decreased specific gravity, with a corresponding increase of bulk in the twenty-four hours. Three were suffering from septicemia, and died of septic endocarditis. One died of septicemia without heart involvement. This was a recent case, in which bacteria were found in the bloodstream on culture, which bacteria were identified with those found in the pockets about the teeth, and also in an area of necrosis located about the two upper central incisors. Of this group of forty, twenty patients had pronounced joint involvements, ten of which were distinctly improved by treatment; one might, in fact say, cured. Five were improved and five not benefited. Of these forty cases, nineteen patients showed albumin in the urine before the mouth infection was attacked, which cleared up after the stamping out of the mouth infection. One of these patients had been suffering from ulcer of the stomach, the diagnosis of which was made by an exceedingly competent medical adviser, and was of two years' standing, though believed to be much longer. In this particular case, albumin was present in the urine. This patient suffered an intractable constipation, accompanied by a marked failure of stomach digestion. He yielded to treatment readily and after a period of two months gained in weight over 20 pounds and lost all evidence of tenderness in the abdomen over the area where stomach ulcer was believed to exist.

A recent case is of great interest. The patient, a banker, suffered severe pain in two of the lumbar vertebrae, accompanied by pain and soreness in the wrist, elbow and finger joints. He made no material improvement until several abscesses, abscessed teeth, and pus infections in pyorrhea pockets were eliminated, after which he made a fairly rapid and satisfactory recovery. This patient was a man 58 years of age, and the total period of his incapacity from business had been eight months. For four months of this time his suffering was exceedingly acute, being bedridden. On account of the great tenderness in the vertebra, he was allowed to turn over in bed only once in twenty-four hours. Tuberculosis was not present. None of the symptoms bore out such a diagnosis.

In another case, the patient, a man of 62 years, suffered from a persistent and destructive inflammation of his left eye, having continuous pain for months, gradually losing the sight of the eye, and suffering intense pain radiating from the eye to the occipital region and down into the neck and shoulder. An abscess was finally located in the lower mandible near the mental foramen, involving the inferior dental canal. The opening of this abscess resulted in complete freedom from pain and a fairly rapid recovery after an illness of five months. The patient regained his bodily strength and vigor, but never regained the sight of his left eye.

There really seems to be no function or tissue of the body which may not be reached by infections occurring in or originating through lesions in the oral tissues. It seems eminently proper, therefore, that physicians should scrutinize more closely the mouths of their patients in all their routine examinations; insist on radiographic examination to discover impacted and diseased teeth, and insist on the extraction of diseased teeth, unless the patient is in the hands of a competent dentist who comprehends the vital relation which diseased and impacted teeth bear to the general health of the individual.

## DISCUSSION.

**Dr. Joseph Head**, Philadelphia: The time has come when the dentist no longer considers as his chief work the restoration of teeth for the purposes of mastication. His primary work in the future will be to rid the mouth of infection, in order that the system may not be subject to diseases that, with the proper method of treatment, could be prevented. The point which Dr. Hartzell made, namely, that physicians should examine the mouths of patients to see if pyorrhea is present, is well taken, but I would add that dentists must feel that the examination of the mouth for infection takes the most subtle discrimination and analysis and requires all the technical skill and special knowledge of a dentist and a medical man combined. I had an interesting case in point a few weeks ago. A doctor came to me with a tonsil enlarged to three times its normal size and told me that he thought that he had pyorrhea. I looked into his mouth and it seemed perfectly healthy. There was apparently no disease of the gums. Finally, I probed between the wisdom tooth and the twelve-year molar; the probe went up past the buccal roots into a large pocket. The patient was particularly anxious that I should make a vaccine, so I took the proper amount of material from the walls at the base of the pocket and then made an application of ammonium bifluorid to the pocket. In a week the patient came back with the expectation of having me use the vaccine, but when I looked into his mouth I found that the tonsil had been reduced to its normal size and there seemed to be no other condition of infection present. The pyorrhea pocket was cleaned up. When the contamination from the tooth was removed the tonsil regained its normal condition.

**Dr. T. L. Gilmer**, Chicago: I think that the pathology of the teeth has been pretty well understood in the past, but aside from this the mouth has received insufficient attention. The average mouth may look healthy, but I venture to say that, if a narrow, very thin explorer is passed between the teeth and gingivae, hardly a mouth will be found without some pockets about the roots of the teeth. These pockets arise from slight traumatism. We often find in the lingual gingivae of the upper central incisors slight injuries which become pyorrhea pockets. Had these injuries been found in time and the cause removed, a more serious infection, or a pyorrhea pocket, might have been obviated. Fortunately, of late a real interest is being exhibited by dentists in the condition of the mouths as well as the teeth of their patients.

The members of the Northern Illinois District Dental Society are making a systematic examination of mouths to determine the extent of pockets about the teeth. This must lead to good results. When the physician more fully comes to realize the dangers from foci of infection in the mouth, which not infrequently lead to serious pathologic manifestations in other parts of the body, he is going to examine the mouths of his patients more carefully. The average practitioner of medicine is not sufficiently skilled in oral examinations to make a really critical examination of the mouth. He should supplement his work, when he suspects that the mouth may contain a focus of infection, which may be the cause of disease elsewhere, by calling to his assistance a well-qualified dentist, just as he would call in a rhinologist or an ophthalmologist if he wished the nose or the eye examined. On the other hand, the dentist ought to look more carefully into the physical condition of his patient when he finds chronic infections in the mouth to determine whether the oral condition may not have caused some manifestation of disease, in order that he may refer the patient to a skilled general practitioner, if necessary. All diseased and unclean mouths should be made clean and healthy. This ought to be done regardless of the loss of teeth. Teeth are very important organs and should not be removed ruthlessly, and most mouths may be made healthy and the teeth saved, but health and life are much more important than teeth.

Dr. F. B. Moorehead, Chicago: There is a definite antecedent in this condition which we are trying to correct, I think, by working at the wrong end. When I was a student the emphasis was not placed on the possibility of the mouth as a disease-producing factor, but on the necessity of a fine gold filling, of accurate adaptation, of partial plates and full dentures, and the accurate construction of crowns and bridges. We do not gain anything by criticizing our forbears. This is a matter of evolution. Therefore it is not proper to condemn the dental profession of those days, but it is only fair to say that they gave insufficient attention to the pathologic side of the profession and overemphasized, overstated, the mechanical side—if you can make that distinction. This attention to the mechanical side was born and bred in them as students, and it is difficult to get away from such training unless one is a student all through life. One may go into a dental college infirmary today and witness students at work putting crowns and bridges into mouths that are in a terrible condition, the teeth covered with tartar and pyorrhea pockets filled with pus. I am not overstating the facts. Our schools should insist that after the student has relieved the patient's suffering he must see that the tissues in the mouth are made healthy before he attempts anything in the way of construction of mechanical aids to mastication. If this is emphasized and insisted on, the student is going to get the point of view that he should have. Then we must demonstrate to our students the infections that are being discovered today that can be traced directly to the mouth. It is possible, of course, to overstate the question and do ourselves harm by saying that the mouth is responsible for everything; but the statement that the mouth is, perhaps, the most important single avenue of infection in the body will, I believe, bear close investigation. There are, however, other avenues of infection—the adenoid tissue, the tonsil, the pharynx, the prostate and many other areas that must not be lost sight of. The work that is going to accomplish most in the future is the proper training of the dental student.

Dr. Nelson T. Shields, New York: If I remember correctly, Dr. Hartzell said that quite a large percentage of his patients were neurasthenics and that 40 per cent. of 120 neurasthenics showed the direct relation between the nurasthenic condition and infection in the tissues around the teeth. For the perfect treatment and care of the mouth all calcific deposits should be removed, and thorough prophylaxis should be established. If in that treatment a part of the root is exposed, the treatment is liable not to end there. If this should give temporary relief, well and good. If the patient should have an infected gum within a short period afterward, and the infection cannot be controlled by external applications or constitutional treatment, with the help of the physician, then you should look for the internal injury which would be within the pulp itself, because you cannot have an exposed root without having the calcific deposits within the pulp. This will induce an abnormal flow of blood through the arteries and also an immigration of leukocytes, which cause compression on the veins within the pulp, and this likewise causes calcification by irritating the odontoblastic cells. This classification, if the constitutional cause is not removed, will eventually cause the calcification of the entire pulp, which naturally means death to it. So that in the neurasthenic cases, gum infections are apt to be caused by the canaliculi extending entirely through the dentin to the cementum, and can be caused from within the pulp from constitutional causes as well as from local causes which are manifested on the outside of the teeth. In severe cases I would extirpate the pulp of such teeth, and after thorough cleansing of the root-canals mechanically, would fill them to their apices with gold, and the remaining portion of the canals with the oxychlorid of zinc.

Dr. William C. Fisher, New York: I think that, without a doubt, we should excuse the teachers of years past on the ground of progress, but we cannot excuse those who are teaching the same things today. The members of this Section were recently invited to the meeting of a state examining board. One of the examiners took two or three of us to a chair and exhibited a new method of crowning. In passing a mirror around the mouth I saw one of the filthiest mouths I have ever seen in a clinic. A student was being taught to do but one thing in the mouth—to make some new character of cast crown that some particular skill has brought out. I remarked to the examiner, ''My! What a wonderful case for a prophylactic clinic.'' He said, ''Yes, it would be a rather good case for that, but we are just holding a crown examination today.'' What conception of dentistry can that man have if a state board of six men will license him to put a crown into a mouth without making any effort to remove the calcareous deposits and reduce the hemorrhagic condition of the gums? One lateral was almost completely hidden posteriorly by the congested gum; but that had nothing to do with the examination they were holding that day! How much better to say to a student or a graduate, ''Here is a mouth; place that mouth in a healthy condition,'' and see what procedures he would take.

Dr. C. H. Oakman, Detroit: We who know Dr. Harlen and who had the privilege of being his students know that prophylaxis was the fundamental teaching of his work, although he did not use the term prophylaxis. ''When the patient enters your chair, examine the mouth carefully and see that the mouth and teeth are properly cleaned before any reparative work is done.'' This was his teaching; he was far in advance of his times and now, after twenty-two years, his teaching has become almost universal. Dr. Fisher just said that state dental boards are lackadaisical in some of their work, but we who have served on state boards for a number of years, would like to do many things which are absolutely impossible. We cannot put a mouth into a hygienic condition when we have an urgent case to complete in a limited time. I think we are just awakening to a realization of the treatment of pyorrhea alveolaris. Possibly all of us, who have treated pyorrhea, have treated cases repeatedly and have met with no definite result. We discharge the patient after a dozen or more treatments, telling him to return in thirty or sixty days. At the expiration of that time the condition of the gums about the crevices of the teeth and other pathological conditions show that our progress in their treatment was quite unsatisfactory. I have in mind three cases of this kind which I treated. I had the urine tested and in one case found that the patient had 6 per cent. sugar and another 3½ per cent.; the third went to Carlsbad with 4 per cent., but after treatment there returned with the urine free from sugar. These cases were not amenable to treatment while the sugar condition was apparent, but after its elimination two of the cases readily yielded to treatment. I now make it a practice to have the urine examined in all suspected cases. Dr. Talbot says, and I think he is right, that a great many of the so-called cases of pyorrhea are no more than cases of gingivitis. There will be no pyorrhea if we can eliminate gingivitis early in the case. It is only when we allow that condition to persist that pyorrhea is developed.

Dr. G. V. I. Brown, Milwaukee, Wis.: I think that Dr. Fisher is unreasonable. He has evidently forgotten that these men are not teaching. They are supposed to let the applicants do as they wish to do, marking them accordingly. I think that it would be out of place for an examiner to take up that matter with the applicant. On the other hand, take the applicant's side; he has only a limited time in which to do certain things; there are a great many other things which he might do in his office. I think that when Dr. Hartzell undertakes to say what should and should not be done in this matter of oral hygiene he should remember that in order that this may be done to the best possible extent, an exceedingly delicate skill in diagnosis is required. It seems to me that that is the weak point in this paper, and that the purpose of this section ought to be in the direction of trying to make it easier for physicians and dentists to come together on a common plane, so that the knowledge of both may be applied in these cases and a great many of them relieved. For instance, I have just had a case of a little one who gave a history of a recent tonsilitis and of the injection during the course of treatment of large doses of antitoxin. After a short period of rest a swelling appeared which involved the region of the neck, the submaxillary region and all the regions to some extent behind and above the angle of the jaw; to complicate the condition still more a dentist had been consulted and had opened into a deciduous molar. The deciduous molar was then undoubtedly involved, whether or not it had been previously. At any rate, the treatment of the case through that deciduous molar, if it were an infection from the tonsilitis, would not have done any good. The patient's urine showed acetone, diacetic acid and albumin; in other words, that little child was in a condition in which the giving of an anesthetic was almost prohibitive. This is just the sort of thing that occurs when the physician and the dentist work separately. In this case a condition of things had been brought about in which it was almost impossible for anyone to make a diagnosis, and so I did what anyone would under the circumstances. The condition of the kidney was definite. I kept the child quiet, on proper diet and carried her through nicely. We finally found pus, and after its evacuation later—there were two or three ounces—we were pleased to find that in the culture it showed no growth.

Dr. William C. Fisher, New York: We had an address from our chairman yesterday which pointed out the great need for work along the lines of Dr. Hartzell's paper. We have all been talking of and wondering where we could get men to do this work, and we said that we would have to educate them. The minute a man criticizes what is being done by the state board, he is censured for it. Dr. Brown made the statement yesterday in private that if one hundred dentists were invited to this room, 25 per cent. could not discuss the papers here. They will not be educated to discuss these scientific papers if the making of a crown is the main requirement for getting a license. I want to reiterate that I consider an examination of this kind unfair to the applicant and to his alma mater, and to the persons he is to serve. We do not want good jewelers. My hat is off to the prosthetic men; they did good work in the past. They laid the foundation on which we have built our profession. This side of our work should not be slighted, but the pathologic side is still being slighted by our state boards.

Dr. Truman W. Brophy, Chicago: The teachings of Dr. Hartzell's paper are living issues. They will be quoted by men in the profession everywhere. His conclusions, I think, are logical. The discussion which has followed has, it seems to me, been in part rather unfortunate. Dr. Fisher brought up a phase of the subject of prophylaxis, which, it seems to me, should be carefully considered by this Section. I know quite well some things about dental teaching and the work that has been done for more than a quarter of a century in dental colleges, which have made American dentists famous throughout the world. I know that the American dental college professor in other lands is respected and regarded as an honorable man. We know that the good status of our profession today throughout the world has been due more to the work of the honest dental college professor than to any other factor, and as a dental college man, one who has spent the better part of his life in assisting in this great work of dental education, I regret that any man should criticise, not only the college man, but also the members of boards of examiners, who are working with all their might to advance the interests of the profession and protect the people from the charlatan. When a man stands on this floor and says that the board is neglecting what he believes to be a duty, he does not remember that for over a period of two weeks this board has been laboring hard with these men right along the very lines that he says are neglected. More than one hundred candidates are here before the state board, as I understand it. They have not the time nor the opportunity here to enter into the study of pathology or carry out a long course of treatment. They have been through that in their written examinations, and today they are doing the practical work which the board demands. These are facts which we cannot overlook, and the members of the board are all to be commended for their self-sacrifice, their devotion, and their earnest labor to see to it that these men, now having completed their written examinations and answered all the questions as best they knew how, are now tested as to their practical merits.

Dr. A. T. Rasmussen, La Crosse, Wis.: This controversy regarding the duties of the state board makes me feel sorry for any state board. I was one of the men to take the examination in the state of Wisconsin, and I really cannot forgive myself for the way I treated that case. I knew it was wrong. I said to the examining board, ''Gentlemen, it will never do.'' One member said to me: ''We have no other patient; go to it.'' What the results were I do not know. We were short of material. One of the remarks Dr. Brophy made was in reference to practical things. I think that we ought to do away with the discrimination between practical and theoretical dentistry. Pathology is practical. We must have a working knowledge of pathology if we are going to treat diseases of the mouth, or any other part of the body. I am not criticizing anybody for the use of these terms. I use them myself inadvertently, but I think that we should aim to get away from the idea that pathology is not practical.

One other thing I wish to speak of is this: In some of these clinics there is no provision made for washing the hands, and it is not right for men to put their hands in the mouths of patients without washing them. If we will look after these so-called little things, the big ones will take care of themselves.

I think Dr. Moorehead struck the keynote of the whole situation when he said, ''unless we are students through life.'' Unless a man is a student through life, he has no business in the profession—either medical or dental.

Dr. C. H. Oakman, Detroit: For the inspection of the teeth of school children in the city of Detroit we have four dentists who never use a mouth-mirror. If an inspector uses one and it becomes known to the Board of Health, he will be censured.

Instruments of any kind are not permitted in their work. Wooden tongue depressors are used and discarded after being used but once. In this way there is no infection. Neither is it necessary for the operator to put his fingers in the child's mouth. It is impossible to make a thorough examination of the teeth in this manner. We do not intend to make as thorough an examination as if the patient were being examined at the clinic. If the mouth is unhygienic, teeth covered with tartar, food deposits, etc., it is absolutely impossible for an inspector to make a comprehensive examination. What we aim to do is to find the defects, and then refer the patients to their dentist or to the clinic. At the same time we place in the child's hand a pamphlet on oral hygiene which it is instructed to take home, so that the parents may be enlightened on this subject.

Christian Scientists did not want the children's teeth examined by the medical department, so as soon as the child brought a note from the parent saying that it was not necessary to have the teeth examined, according to their way of thinking, they were not molested. But I think in all clinics where a wooden tongue-depressor can be used the mouth-mirror should never be used.

Dr. Thomas B. Hartzell, Minneapolis: I was informed by the Secretary of this Section that the Section did not make a great bid for dentists as members, because the average dentist could not take part in a discussion and keep himself to the subject, and it has been beautifully demonstrated here today that this is the case. Two or three of you have not discussed my paper, so I will recapitulate briefly the thought of that paper and tell you why I wrote it. I wished to show that the mouth is the great portal of infection; that the continuity of lymphatic tissue leading from it makes it almost impossible for the remainder of the body not to be infected from it if lesions exist therein, and I wished to bring to the medical profession, as a profession, a group of statistics proving that about one in every ten persons suffering from systemic infections will show the portal of infection in the mouth. I did not say a word about pyorrhea or any other specific kind of mouth infection. I wanted to make evident that the mouth is a great portal, perhaps three or four times as great in importance as any other part of the body, and I wished to bring that up in such a way that my medical friends would believe it and give it the credit it should receive.

As to the question of the treatment of pyorrhea or any other type of mouth infection, I have nothing to offer in this paper, but I do wish to thank the men who have apprehended my idea and discussed that. I do not believe that the part of the discussion relating to methods or special diseases, pyorrhea, abscess, or any thing of that kind, really belongs in a discussion of this paper. Medical men have come to think, and justly so, that dentists are greatly at fault, and have not sufficient scientific training, as was stated by Dr. Brophy and Dr. Moorehead.

If the medical profession realizes that dentists can do better work in this direction, they will unite in demanding of the dental profession that they must do it by setting an example in the way of extracting diseased teeth and condemning their confrères who attempt to do conservative work and at the same time foster infection. If this results, then my paper will have accomplished something worth while.

## TO PATCH A LEAK IN BELLOWS DISK

BY R. L. HESSER, FRANKFORD, MO.

Often a bellows disk will break during an important soldering operation. To make a quick repair—providing break is not too large—cut a piece of red vulcanite rubber twice the size of break, apply a little gasoline and press firmly to place. Do not remove the linen cover from the rubber for it makes a stronger patch.

# ESTHETIC BRIDGE WORK AND SOME HINTS UPON FILLING FRONT TEETH*

BY D. D. ATKINSON, D.D.S., BRUNSWICK, GA.

THE DISPLAY OF GOLD in the construction of prosthetic appliances and in filling teeth, is, I am glad to say, growing more and more into disfavor, and among people who are cultured, more and more intolerant; even abhorrent. It is not the purpose of this paper to undertake to teach any new methods of filling teeth, but merely to express the writer's views touching some of the methods being taught and practiced in the profession today. The sight of gold is abhorrent in the human mouth. Unfortunately we have no other recourse in a great many cases, and in these cases it is a blessing. Every dentist knows that there are cases where gold cannot be concealed and subserve the best interests of his patients, both in prosthetic and operative procedure.

We often have patients present where the incisors show approximal decay; the labial and lingual walls of about the same integrity.

The question arises as to whether the cavity shall be approached from the labial or lingual direction, and upon this decision rests the fate of the harmony which Nature has bestowed in a beautiful set of incisors. For the sake of convenience to the operator, the cavity is often opened from the labial aspect, and the beauty of an harmonious and symmetrical expression forever thereafter destroyed by the glitter of a gold filling, where spotless enamel had theretofore been the dominant feature. The labial wall once destroyed can never be restored in the esthetic sense that prevailed before the operation.

To my mind, where incisors have to be filled, there is nothing so artistic and beautiful as to fill them from the lingual-surface in such a manner that they will appear not to be filled at all. My apology for touching on this subject is that I so frequently see what was once a beautiful set of incisors marred in the manner described above, and frequently at the hands of prominent American dentists'

The main object of this paper is to discuss briefly, the systems, or some of them that are employed in the construction of bridgework, and to point out what may at times prove to be an improvement from the esthetic point of view. The prevailing method of making a posterior bridge either for the upper or lower teeth, is to make the abutments on gold crowns and the dummies either of solid gold, or of solid gold with porcelain facings; that is, that the facings will be capped with gold sufficiently thick to give strength to the bridge. In this manner, say on the lower jaw, the crown surfaces of the entire bridge will show solid gold, the porcelain facings being almost entirely concealed by the cheek muscles.

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*Read before the Georgia State Dental Society, 1913.

Every time the patient's mouth is opened the gold is exposed to view displaying what appears to be a mouth full of gold—utterly distasteful to people of refinement.

The only excuse to my mind for such a display of gold, or for that matter of gold at any time in the human mouth, either in prosthetic or operative work is that the ends could not be met as well any other way. Of course when necessity demands it, it is all right to employ gold anywhere.

A few years ago, Dr. Dashwood read a paper before this Society in which the use of a cuspid as an abutment was a subject of discussion. If I remember right, he offered three alternatives in the preparation of the abutment. *First*: To make a window face crown. *Second*: To make a solid shell crown. *Third*: To cut the tooth off, and use the root for the abutment. The Alexander hood abutment was little known at that time. He recommended the window face crown, as being the most conservative.

In recent years several methods of providing posterior crowns of porcelain have been devised, and manufacturers and inventors have produced teeth of different types for the production of more sightly bridges. My experience, however, is that all of them can only be employed only where there is not too close a bite.

The bridge I shall describe, is made in connection with the diatoric tooth and although this tooth was designed for rubber work, it makes what to my mind is the most practical, as well as the most esthetic substitute for lost molars and bicuspids. Simple in construction, and strong in resistance, I believe it will, in time, come into general use. The tooth is cemented into the bridge, never having been exposed to the fire, therefore free from those checks which are often so fatal to porcelain facings, and then if one should break (which I have never seen), it can very easily be replaced by the selection of another tooth and slipping it on without removing the bridge. It is contemplated that in the construction of this bridge the supports will be made when possible, on hood or inlay abutments. The process is as follows: After the models have been made with the abutments in situ, the teeth are selected, common diatoric teeth, to suit the case in size and shade, and they may or may not need any grinding. Each separate tooth is held in the left hand, while softened casting wax is forced into the depression and around the tooth except the labial or buccal surfaces, being withdrawn several times to insure its working easily after it is cast in gold. The wax is then trimmed to the shape desired, the tooth being in the wax socket thus prepared is set aside, and each tooth for the case treated in like manner. After which all are set in position on the model and fastened together with hot casting wax to the exact form desired for the finished case, except that they must not at this time be fastened to the abutments. The teeth are then removed from the wax and the latter invested and cast, all in one piece if possible. If this is well done, it will be found that the teeth will fit each in its own place accurately. The cast with the teeth in position is then placed on the model, and the cast waxed to the abutments. The teeth are then again removed and the piece soldered to the abutments and polished. The teeth are then cemented onto the finished bridge and the case is ready for the delight of the patient who will be perfectly willing to reward the operator for his patience. The diatoric tooth is also admirably adapted as a crown for broken-down molars and bicuspids. A molar, for instance. The root is prepared by trimming the stump on the buccal margin as near to the gum line as desired and shaping the original pulp cavity for a retaining socket supplemented by a pin in one of the roots. A diatoric root is then selected and with casting wax previously warmed forced into position. The wax trimmed and removed from both the root and porcelain, cast and polished. It is then ready to be permanently set in the mouth cementing the cast to both the root and the tooth at the same time. It is of course presumed that the roots will have the proper attention.

# THE USE AND ABUSE OF SILICATE CEMENT*

BY DR. W. M. ZIRKLE, ATLANTA, GA.

When the Silicate Cements were presented to the profession for consideration about twelve years ago, they were taken up and used by many of our best operators. The manufacturers gave very comprehensive instructions, not only as to the mixing and instruments to be used, but the absolute cleanliness to be observed, as well as the cavity preparation. This material being a liquid and powder caused many, I fear, to mix and use them as they did the oxyphosphates. Many failures resulted, and a perfectly good filling material was condemned, and discarded by many because of improper manipulation.

I was among the first, I think, to use the Silicates, and I am still using them with excellent results. I have had some failures, but so far I have not been able to trace one failure to the material used. The fault is with the operator. I have kept a record of these fillings and many are giving good service that were made when I first began its use. It does not require an expert to work Silicates, but *DOES* require the operator to be quick, careful and follow absolutely the directions given by the manufacturers. During the last six years, I have had three young men in my office who have used the Silicates successfully. For the benefit of those who have had failures, as well as for those who may wish to try them, I will give you my method of working Silicates.

First, the selection of the cavity. This is very important. I confine myself to simple cavities usually in anterior teeth; in a few cases, however, I have used it in approximal bicuspids, where the filling extended to the occlusal surface, provided the bite was not too close. After the dam and separator are in position, the tooth should be washed in alcohol and shade or shades selected while the tooth is moist. Prepare the cavity as for a gold filling, make heavy undercuts at cervical margins and cutting edge; if cavity is deep, line with cement, same shade. When cavity is prepared, I again bathe in alcohol and dry with warm air.

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*Read before the Georgia State Dental Society, 1913.

Bone or agate instruments should be placed close at hand where they can be easily reached, and the different colors of the material placed on opposite sides of a perfectly clean slab ready for the mix. With the glass rod mix the liquid thoroughly, then place the required amount on the slab, and with agate or bone spatula, draw in the powder and let it be absorbed, just working sufficient to thoroughly moisten. When the required consistency is reached, spatulate just enough to thoroughly mix, and if the proper proportions have been used, it will pull when the spatula is lifted. The mix should then be quickly packed in the cavity, first in the undercuts and over the margins, then larger portions added until the cavity is more than full. A celluloid strip is then placed over the filling and burnishers used to condense. This should all be finished while the filling is soft. After finishing, the filling should not be disturbed for fifteen minutes, after which it should be polished with strips coated with cocoa butter, then bathed with alcohol and allowed to remain fifteen minutes longer, when a coating should be put over the filling, and the dam removed. If this technic is followed you will have no trouble with Silicate Cement.

## CAVITY PREPARATION USING ETHYL CHLORIDE *

BY O. E. LANPHEAR, D.D.S., PAW PAW, MICH.

The tooth is prepared ready for operation with the rubber dam in position and some protection made to keep the ethyl chloride from entering the nostrils. A pellet of cotton is laid over the cavity and a little ethyl chloride is sprayed upon it. This is allowed to evaporate slowly and a very fine spray from the finest gebauer tip is allowed to play upon it constantly for several minutes. If the patient experiences severe pain, the spray stops. This is continued until the tooth has a slight layer of frost on it and there is no pain from the cold and there is no sensation in the cavity when touched with the bur or excavator. The cavity can then be prepared without danger of pulp exposure and is easily finished within a few seconds.

If it is used for nerve removal, the cold can be continued a few seconds and the pulp chamber entered and the nerve taken out under immediate pressure. In this work use a flexible extension on the gebauer tip which has a shut-off at the further extremity, allowing the operator to keep the tube below the patient's line of vision—thus removing one element of fright.

We use an extension tip without the shut-off if we have an assistant. Extreme care must be used to avoid too prolonged analgesia, because it may cause death of the pulp.

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***Clinic at Southwestern Michigan Dental Society, 1912.**

# SOME OBSERVATIONS BEARING UPON THE BUSINESS SIDE OF DENTISTRY*

BY W. F. WHALEN, D.D.S., PEORIA, ILL.

IN SELECTING THIS SUBJECT for a paper for the consideration of the members of this society, I am not unmindful that it is a most radical departure from time-worn precedents; yet I have no apology to make, believing, as I do, that the time is ripe when we must give more consideration to this hitherto much-neglected phase of the practice of our chosen profession.

That my attitude towards everything that pertains to the scientific, theoretical and practical sides of dentistry may not be misunderstood, permit me at this time to state that anything which I may have to say in this paper should not in any way be considered as disparaging to the many able efforts which have been made along those lines, for I believe after all, that those are the phases upon which more than anything else the success of our efforts as a profession most depends.

We are living in an age of organization and rapid advancements and no work can be considered well rounded unless it comprehends thoroughly everything which has a bearing, directly or indirectly, upon the fundamentals of that calling.

The ranks of our profession are being continually augmented from every walk of life and from all the races of our most cosmopolitan society. Inasmuch as the candidates for entrance to our dental colleges are there from personal choice and not by selection of any authorized body as to their special fitness to take up the study of dentistry, it becomes evident to even the most casual observer that certain well-defined standards of educational requirements should be adopted by the various State Boards and religiously lived up to by the faculties of the colleges to the end that the standard may be the highest consistent with the needs of the public.

In this state as well as my home state, happily it can be said, the board and faculties have for years taken most advanced ground and while they have met with steady opposition from many sources, have stood steadfast for the highest possible educational requirements, a fact of which the dentists of both commonwealths have every reason to feel proud, as it has done much to blot the stigma from the fair names of both of them of being the dumping ground of the dental profession of America.

I predict that the day is not far distant when we shall have a fair and uniform national standard for entrance qualifications for the study of dentistry and, naturally, will follow uniform State requirements for examinations and universal exchange of licenses or reciprocity so-called.

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*Read before the Indiana State Dental Society, 1913.

All dental colleges have in their curriculae courses of varied length and thoroughness upon dental economics; but so far as I am able to ascertain they deal much in generalities, usually taking high flights in ethical aerial navigation, here and there coming down to earth, but on the whole leaving the prospective candidate for finished dental credentials with rather a vague idea of the real amenities or necessities of the practical conduct of a dental practice.

For years we have been regaled with a lot of high-sounding "bunk," voluntarily and most dramatically handed out by many of our most successful practitioners and some allegedly successful ones, that it is beneath the dignity of a professional man to consider the matter of fees, only as a secondary feature; but that far-away cry has become threadbare and obsolete until now there is another knocking at the door of Ethics for entrance and his name is "Rational Business," and, gentlemen, he will not down: but must be heard and will be.

Conditions have changed and the present time is most opportune, when our profession must arouse itself to the financial exigencies of the conduct of a dental practice and busy itself in putting its house in order that it may be in a position to better meet the increasing demands of the public.

I refer particularly to the increased cost of living and doing business, also to the rapidly-increasing obligations consequent upon the nation-wide propaganda of mouth hygiene. It is not necessary to dwell at any length upon the increased cost of living and conducting a modern dental office. Every practitioner has long since come to realize that both of these items have at least doubled in the past five years; not so, however, with fees.

The dentist's fees, with but here and there an exception, have undergone no advance and if we are ever to hope for a realization of better than a mere living salary, it is incumbent upon us to take the initiative.

Reform in this direction must be approached conservatively and with due consideration to the rights of the people.

I do not wish to appear before you in the light of demanding unjust and exorbitant fees for our services; but adequate compensation based upon the cost of rendering such service.

This can only be accomplished with fairness and equity, by the dentists associated locally going carefully over the conditions governing the practice in their community, and arriving at what *they* think is a just compensation.

Conditions vary so throughout the state and nation, urban and suburban, as to render any attempt at uniform fees wholly impractical.

To intelligently arrive at what should be adequate compensation for our services we should ascertain what our overhead expense is; to be more definite, we should figure out how much we have invested in our education, what it has cost us together with what we could have earned during the time we were at college, were we engaged in some other pursuit.

To that we should add the cost of our equipment and stock of supplies, the sum total should represent our capital stock and should net us the legal rate of interest.

Having that as a basis we continue with rent, assistant's salary, depreciation charges, lost accounts and customary incidentals thereto adding such amount as we feel we should have as salary, the latter not to remain stationary, but should be influenced by the same law of reward for service that is recognized in every calling.

The best data which I am able to obtain leads me to the conclusion that not to exceed ten per cent. of those practicing dentistry are making more than a bare living, and of those, few are making any considerable sum such as would permit them to retire or even ease up when their physical energies are waning so that they are unable to withstand the demands of a living practice.

To my mind the most prolific cause for such conditions is that a vast majority of practitioners get away to a bad business start, due, I think, to a marked extent, to being improperly and inadequately instructed in the fundamentals governing the financial side of the practice of dentistry.

Realizing fully, as I think I do, that the college course as at present constituted is crowded to the utmost with theory and practice, still to what ends are we working when we continue to send out our young men with little or no knowledge as to what will be expected of them in a financial way? What justice can there be in launching upon the sea of life a set of men, be they ever so well equipped with technical knowledge and skill, but utterly lacking or nearly so, in practical training, only eventually, and that all too soon, to be wrecked upon the rocks of financial incompetency?

I do not refer to this phase in the spirit of fault finding; but in the hope that it may be productive of some reforms that may assist in bringing about improved business conditions.

The average dentist after he has been practicing eight or ten years finds the grind of his everyday duties rather irksome and suddenly "wakes up" to the fact that while he has been building up a practice, he has saved little or nothing; but has an obsolete equipment and a fine assortment of IOU's for his efforts.

Determining then, as he usually does, that he must get increased fees, if he is ever to get anything ahead, he finds himself confronted with that apparently never-ending proposition, the annual influx of embryonic dentists fresh from the fountains of dental knowledge, eager to jump into the maelstrom of professional activities but sad to relate just as ignorant of the cost and value of his services as were most all of his predecessors and unless he be possessed of a strong heart and the courage of his convictions. he continues as before, working for a meager salary, himself guaranteeing the collection of the same.

Though we may ever so vehemently declare that we are not in competition with anyone, nevertheless we must admit that the public draws conclusions by comparison and inasmuch as its horizon of observation is bounded by certain locally circumscribed limits, said conclusions are productive of much unfavorable comment as to the disparity in fees and office practices leading naturally to estrangement between colleagues who would otherwise be working in the utmost harmony for the best interests of humanity in general and at the same time doing themselves justice.

Time was when every practitioner held as secret his methods of procedure but happily that sentiment no longer prevails until now we stand as an advanced profession giving and accepting freely of the fountains of professional knowledge, with the primary object that the public may be the best served.

We must not continue longer to delude ourselves into thinking that it is unprofessional to consider remuneration for our services as of vital importance, for while the highest possible ideals of ethics are most earnestly to be desired, and I would not for a moment advocate receding one iota from the magnificent heritage which is ours by virtue of the high-mindedness of the leaders of the past and present, yet it is the height of foolishness for us to presume that the public will take serioully any statement upon our part that we have naught but a secondary care for the financial considerations governing our efforts. I believe it is time that we cut out this "tommy-rot" and come out openly and formulate and adopt rational business rules for conducting our practices, demanding sufficient compensation for skillful professional services, thereby gaining for ourselves a position in the community as business men who not only know the technic of our calling but also know the value of the service we are rendering.

The average dentist is considered in the eyes of business men as a "huge joke" whose knowledge is confined to care for the teeth and who knows practically nothing about business, even his own, not to say any other.

We should bury animosities and petty jealousies and cultivate the spirit of good fellowship. If we will but do these things it will be only a step farther towards the accomplishment of one of the most essential things to the perfectly rounded-out success of our profession, to wit: The placing of it upon a rational business basis.

I refer to making it possible for the average practitioner to make not only a living, but in addition to provide a competence such as no fair-minded person could deny was his right.

To the attainment of such ends each dental society should have a committee whose duty it should be to formulate rules tending to place the practice of dentistry upon a more uniform basis as regards fees, broken appointments, cash deposits, collections of accounts, rating lists, etc.

Every practitioner should engage as actively as possible in public service work along the lines of oral hygiene.

It is our move and the world awaits our action. Time never was more opportune for the advancement of the propaganda of mouth hygiene.

With our National Mouth Hygiene Association under the National Dental Association, well organized and endorsed by the laity as well as by the professions, we would not only be missing a golden opportunity, but also be remiss in our duty to the people were we not to wage unceasingly this warfare on unclean mouths.

It is needless to dwell upon the dangers of communicating disease through lesions and defects of the oral cavity, before this or any other dental society, but to know it ourselves is not sufficient.

We must do all we can to spread our knowledge to the end that we may assist our brothers of the medical profession in bringing about as far as possible ideal conditions of health. Lectures alone, while beneficial, are not far-reaching enough, but we must have hygiene staffs whose duty it should be to care for the teeth of the indigent poor, one of the most prolific sources of the spread of disease.

The point may be made that this should be the duty of the city or county and should be paid for out of the funds obtained by taxation the same as support and medical service. However, the initiative lies with us to show the people the great needs and benefits of such service, in the hope that later on public sentiment may be aroused that ways and means will be devised for properly financing this much-needed work. Logically, this reform can be best brought about by legislative enactment, state or municipal, enabling Boards of Health to appropriate a sum sufficient to properly maintain dental clinics for the worthy poor.

Society as at present organized provides no other manner of obtaining such service, than by voluntary action on the part of the dental profession.

There is but one place where the public can look for such service and that is to our profession which is qualified by training and experience to render the same.

No class of men is called upon to do more charity work than those of the medical profession, the physician and the dentist, and it is a well-recognized law of economics, that in order that we may be in a position to render such service we must first gain the moral and financial support of the people best able to furnish it.

We should put forth every possible effort to obtain general examination of school children's teeth and also provide free lectures on the care of the teeth. Teaching hygiene is much like preaching the gospel—it must everlastingly be kept at lest what has been done will be lost. If the propaganda of mouth hygiene is ever to be firmly rooted it must be started with the children of the grade schools and followed up consistently. The members of our profession could in no manner better serve their interests as well as those of the public than in volunteering their services in their own communities toward the establishment of free lectures to the school children, for it is during these years that the greatest havoc is wrought in the decay of the teeth and the greatest and most lasting good can be done by inculcating the habit of oral hygiene.

## CONSERVATION

When we have succeeded in placing our practice upon such a basis as to insure us a legitimate profit the problem then confronts us as to how to invest our savings.

Of all professional men, I firmly believe that the average dentist is the biggest sucker in the pond. He is considered as an easy mark and the legitimate prey of every "gold brick" artist. If a collector were to visit the offices of the dentists, and I might include our medical brethren as well, gathering up the stock certificates of worthless oil, mining and other companies, what a magnificent display of the lithographic art it would make, and what a story of misplaced confidence and poor judgment it would tell. We are on the list of every get-rich-quick concern and are being constantly plied with literature and prospectuses showing us how we can become independently rich by investing in the stock of this, that or the other fake mining, oil or land company.

These bands of pirates, grafters I might more correctly style them, devote their spare time studying out new schemes by which to swindle us out of our meager savings.

Who here is not familiar with the well-dressed gent (?) who periodically appears and proceeds to hand out to you that same "old story" about being referred to you as a prominent man in your profession and community and how anxious his company is to let you in on the ground floor on their splendid proposition. And alas! How too often you wake up to find out that there is a basement to the "blamed" thing and as most basement are, it is cold and damp and cheerless, and that is where you find yourself.

How inconsistent we are. What would we think of a person who, needing medical or dental attention, would visit a veterinarian or plumber for such attention and advice, yet we dentists almost to a man will take the advice of some stranger or, worse still, often act upon our own meager judgment and experience in matters pertaining to investments, instead of consulting, as any one of ordinarily good sense would do, some good financial doctor to diagnose and prescribe for us in financial matters.

I note by the stationery of your State Society that you have some fifteen committees upon this, that and the other phase of your society work and I grant every one of them is important; but what we need as much perhaps as any other one thing is a carefully-selected committee upon investments whose duty it shall be to warn our members against specific fake schemes and hunt up and furnish upon request information on good investments. Some States have passed "Blue Sky Laws" and until ours do we have urgent needs of an advisory board along these lines.

Your banker will gladly advise you as to safe investments. How many avail themselves of the opportunity? Nay, nay, we are Johnny Wise. Why should we find need of consulting authorities—are we not authorities on everything ourselves?

Our experiences should answer that question.

The most successful investors consult authorities, why should not the dentist avail himself of the same privilege?

It would be most practical and helpful as well as beneficial were every component society to have annually a lecture by some good investment banker.

In closing I might incidentally mention the cheapness and safety of Old Line Insurance, Loan Association Stock, Mortgage Bonds and investments in homes and other income-producing properties, being content with a legitimate return for our money, with an eye and a purpose single to the acquisition of a sufficient competency to insure our respectable support in the declining years of our lives and also provide an adequate annuity for our loved ones from whom sooner or later we must part.

## DISCUSSION.

Dr. J. H. Prothero, Chicago: Dentists would save their health and live longer, if they would charge more for their services, work shorter hours, take more exercise and sleep more. We are not charging as much in proportion to the services rendered, for our ministrations to our patients, as physicians charge, and so I feel we are doing ourselves a great injustice, in this particular respect. There has been much discussion of ways and means for assigning fees that shall be just both to ourselves and our patients. I think the method of charging for time consumed has important advantages over other suggested methods.

It is a good advertisement for a dentist, if he be really superior, to claim superiority. Why should he not? Patients will say, ''He charges more than other dentists, but I cannot get his services without paying his fees.''

I might name a dentist who is getting from sixty to a hundred dollars for rubber sets. He gives value received; his plates are superior. Another dentist, a neighbor, makes sets for sixteen dollars. He settled down into a rut.

In the cases of patients who cannot pay you good fees, make some concession—you can take something for the present, and temporize. Later these patients may become able to pay your regular fees. They often get into better circumstances.

But as dentists often charge, there is not even a scant living in the practice. A young man who had practiced for a few years quit, and I saw him one day playing a piano in a moving picture show. He told me he could make more money at that than practicing dentistry.

Dr. Roper: The colleges have tried to teach their students business principles. Complaint is made that the young men demoralize practice by lowering prices. But some of us have observed that it was the older men who did that very thing. I have had younger members of the profession come to me and tell me they were trying to raise their fees, but were embarrassed by the elders hesitating to come into line.

Dr. Frank Sage, Cincinnati: I have been much interested in the remarks the various speakers have made on this subject, for the reason that it is a subject on which I have written some, in our journals, and have thought more. When our class graduated at the Ohio Dental College, the late-lamented Dr. Jonathan Taft, as Dean, handed to each member of the class a fine-print Bible, together with his diploma. He added a few words of admonition to the effect that in our professional ministrations we must never forget the obligation laid upon us to do as good work for the servant girl as we would for her mistress—and so on.

Perhaps it was a gratuitous inference on my part, but somehow I drew from those suggestions that a young man's natural reward for exceptional care bestowed upon the servant girl, would be, later, a bestowal of the mistress' patronage. After a few years of vain waiting for the mistresses of these various servant girls to appear and make appointments, the cruel fact gradually dawned upon the speaker that mistresses usually seem to shun rather than to be drawn to a dentist who is looked upon with favor by the servant-girl class. It was a disillusionment indeed.

The real reason why patients often seem not to appreciate our services, or at least evince reluctance to pay our bills, is that the subject of dentistry, the prospect of visiting the dentist and submitting to his ministrations, is unpleasant. A man regards with a feeling of pleasure the prospect of presently going to his tailor and being measured for a suit; it may be even a hardship to spend the money, yet the return he is to have for that money spent, he regards with satisfaction and gratification. But when he makes the unwelcome discovery that he needs the dentist's services, the matter assumes a wholly different aspect. This aspect is not in the least improved when he discovers further, that instead of the single filling he presumed would be required, at an expense, possibly, of five dollars, he must spend thirty or forty dollars on his teeth.

As dentists, we who call ourselves ethical, have ourselves to blame for the sentimental presentation to ourselves and to each other, in our dental societies, of the business aspect of our profession as something last of all deserving consideration. There has always been an affectation of rising superior to money considerations; of self abnegation and of devotion to our profession with an eye single to the relief of suffering, and the prevention of suffering. Some of us have felt that this was really all guff, yet we have not had the moral courage to voice the conviction. We have, in short, those of us who by nature had no business sense, particularly, gone on year after year allowing patients to dictate fees to us, until at last we have awakened to the disagreeable and humiliating discovery that we have become as it were missionaries in the field, without the credit that ordinarily goes with the name. While the missionaries of the Cross who go to Burmah, to China and elsewhere abroad have good salaries and are looked after as regards their comfort and safety, we dentists go on doing missionary work with no recognition whatever. We are not unfrequently brought to realize that even our charities, in the way of services bestowed for a nominal fee, upon the deserving poor, evoke no particular sentiment of gratitude in the recipient. We often find that they have a feeling of having paid us all the work is worth, even when we ourselves have a memorandum of having charged one-fourth, or perhaps only one-eighth the usual fee. This is all sufficiently disheartening. After awhile, if we be really considerate of ourselves, and have come to a true understanding of human nature, we insist on such patrons repairing to the dental clinic.

As to the fee itself—we again have ourselves to blame for our lack of self-appraisement. We recoil so far the other way from considering this important matter, that we are apt to omit it entirely, and all because we so fear being ranked with the quacks and mere money-makers outside the pale of the recognized body of the profession, who make these practical matters the leading consideration in conducting their practice.

Again, there is liable to be something in our attitude toward the public that encourages such innocent liberties of speech directed at us, as for instance this: a patient presenting, having some work done, paying at each sitting, comes to have such a regard for his own fairness and promptitude in paying us as he "goes," when he might have gone out from the office without a word, that he is led to make some such indulgent speech as this. "Now, Doctor, I like your way of handling me very much, and I have several relatives I intend sending to you. In fact, if you prove to be reasonable in your charges with them, I can send you a lot of 'customers.' "

This speech, designed to forefend against your robbing any of his family or friends, is really a bit of unintended impertinence. I heard a friend, a dentist, answer such a remark as that by saying, ''I haven't a doubt you are just going to be the making of me,'' which being said perfectly good-naturedly, raised a laugh. Yet men who know you have been many years in practice, thus heedlessly and inoffensively assume that the fact that they have added their patronage to the general sum of all your patrons makes them of considerable importance to you. Even in cities where the able members of the profession may have and often do have their pick of patrons, any old Rube coming in is liable to rate himself thus highly as a promoter of your best interests.

One lesson many dentists need sadly to learn: it is much better policy to make patients fear you a little, than to be too complaisant. Many dentists have far too much of what the phrenologists call ''approbativeness'' for their own good. One need not be grossly blunt and outspoken; but to speak up fearlessly, and enlighten a patient who even innocently is trying to impose on your good nature, is a duty every man owes himself. People respect such a man more than the one who keeps his mouth shut simply because that seems the pleasanter way.

Be assured, you beginners in practice, that such a straightforward presentation of your own rights, after the example I have just quoted, will gain you a higher respect than weak compliance with this type of patient's demand. She will remember it, and her appreciation of you will assuredly be enhanced, not lessened, thereby.

Dr. J. R. Callahan, Cincinnati: One reason beginners in practice find difficulty in making dentistry pay is, no doubt, because they have never given serious thought to any scheme of practice. They have gone to work trusting to luck to bring them adequate remuneration for their services.

I have no hesitation in saying that my first thought and hope and expectation, on entering dental practice, was to secure a select, high-class clientele, to the exclusion of others who might be worthy enough, yet had not means to pay liberal fees. When I found that scheme impracticable, in the comparatively small town, I gave myself no rest until I made a way of getting a start in a large city. There I consistently carried out my early conception; not without sacrifices, however, for in the early days I more than once set my face against accepting patients who did not seem to me of the class I aimed to secure, declining to serve them, even at a time when I sadly needed the fee.

For all the foregoing I have no apologies to offer. I hold that in a profession so exacting as dentistry, so severely drawing on the dentist's reserve force of nerves and endurance, he has a right, if it so pleases him, to limit his ministrations to a class who are able to pay him liberal fees. We are not servants of the public in a sense that we really owe any duty to the body of citizens in the community where we may have chosen to open an office. In some rural communities some of you no doubt have become aware that the rustics actually believe that a dentist is legally bound to serve anyone waiting on him for his professional services!

It was early impressed on me, by a saying of an older dentist, that ''he had discovered that his patients rated him just as he rated himself,'' that I must set my own standards and abide by them, for no one, not even the most friendly-disposed of my patients would take the trouble to set standards for me. So it came about that I inclined to draw the line on servant-girls. A lady for whom I had been working would say, ''Doctor, I have a maid, a girl of refinement, who needs the services of a dentist. She has been referred to the dental college, but I do not feel like having her go there; I want her to have the best of service, and so I am inclined to direct her to you. She is a girl who would appreciate fine work, and—the only thing is this, Doctor, she is a poor girl, and if you work for her, I will ask you to be as reasonable as possible in your charges."

Now, formerly, I was liable to fall for this proposition, made in all innocence, and meant to be a compliment to my skill and fidelity. But after awhile I made a curious discovery, something like this: that a lady making such a proposal, will not, later on, credit you for having done her servant a conscientious service at reduced rates. Not at all. She will speedily forget all about it, or if she recalls it, may even take occasion to remind you, when next she recives a bill from you for services for herself, that you did the work at much lower rates for her servant. I don't say they all do so, but enough of them have done so with me, before I cut my eye-teeth, to warn me against falling for their proposition. So for long years I have had my own little responsive speech all cut and dried for these innocents. What I say to them, when they propose sending the ''appreciative'' maid, at reduced rates—*my* reduced rates, I mean—is something like this. ''I shall be very glad to wait on the young woman, if she is as represented, but I must ask you to allow me to send the bill to you, personally, and I must have your promise to pay it for her. She is liable, more than likely, indeed, to have expensive operations required, and I have no wish to add to my clientele any who cannot pay me a liberal fee.''

That may result in the servant's going elsewhere, which is, after all, more to my satisfaction, for of late years I prefer not to work on any terms whatsoever, for the servant class, no matter how refined they may be.

I have had occasion to observe some curious and interesting phases of human nature exhibited by just such incidents as the foregoing. A lady may ever so innocently, and in ever so kindly a manner ask such a favor on behalf of her servant. If you grant it, you have almost surely put yourself at a disadvantage. For despite her honest wish to do you full justice, to rate you as you rate yourself, once you make the concession she asks, you have in a way lowered yourself in her esteem. Or rather, to put the case from a positive point of view, your declining the honor of working for her servant has favorably impressed her. She will remember that, when she would certainly forget your doing the girl a favor—doing herself, thereby, a favor. Such is human nature.

Dr. J. W. Ritter: Either I am fairly competent or vastly incompetent to discuss this paper, as I must plead guilty of belonging to that branch of the *genus homo* designated by the essayist as a ''sucker.'' In other words, I, too, have not only taken a nibble, but succeeded in getting a generous mouthful of alluring bait as represented by that gilded mass of lithographer's art which led but to the dark, cold basement of despair. I can derive a few grains of solace from the old adage that ''Misery loves company,'' and the ranks of that company are being augmented day by day, until it would seem that nearly every member of our profession would be enlisted.

I heartily agree with the essayist's views and hopes for a ''uniform national standard for entrance qualifications to our dental schools.'' While that may correct some of the conditions that tend to hinder the placing of our profession on a business basis, we must not lose sight of the fact that the business as well as the professional side of dentistry is entirely dependent for its successful development upon the individuality of the person who is conducting that practice.

While the injection of business methods and the same financing of a practice may improve conditions, we must remember that it is a difficult matter to educate the profession as a whole when so much raw material is being put forth each year by our colleges as a finished product. One man's idea of financial returns sufficient to carry overhead and operating expenses may materially differ from his neighbor's. The word ''success'' may have an entirely different meaning to different men in the same locality.

Statisticians inform us that of the people engaged in commercial lines over ninety per cent. are failures, leaving less than ten per cent. who are successful from a financial viewpoint. Will we not, as a profession, come very near that average? Can we not produce one man in every ten who is a success? I believe we can. Again, what constitutes success in a profession? How many dollars must a dentist possess at the end of his career to be designated as eminently successful? Who is to be the arbitrary judge to designate this man as a failure while to that one is handed the laurel and encomiums that indicate his superiority as a financier?

Two decades ago a man was considered a financial success if he were able to amass property to the amount of $50,000 or $75,000. Not so today. A few hundred men have so outstripped the rank and file and piled up such vast fortunes that a man with $100,000 today is considered as possessing only mediocre ability.

I believe the reason so many men within our ranks are prone to grasp at the ''wild-cat'' schemes presented to them by suave, well-groomed strangers is, that we are affected in a measure by the times. You can scarcely pick up a paper or a magazine in which you do not find some reference or well-written version of a frenzied financial deal wherein a vast fortune has been won in not only a few months, but a few hours. The young practitioner is confronted by the increased cost of living, small fees and too often a scarcity of patients. The spirit of the times is upon him. He figures that he will take ''a gambler's chance'' just this once. He dreams of the fabulous returns he expects to win, begins to read the automobile catalog, endeavoring to decide between a Winton Six and a Pierce-Arrow, but the day of awakening arrives. He finds himself in the basement, the roof is off and all the stock certificate entitles him to is a generous supply of ''blue sky.''

To quote the essayist, ''I do not wish to appear before you in the light of demanding unjust and exorbitant fees for our services, but adequate compensation based on the cost of rendering such service. This can only be accomplished with fairness and equity by the dentists associated locally going carefully over the conditions governing the practice in their community and arriving at what they think is a just compensation.''

While that plan might succeed in a few localities, I do not believe it would in the majority. The average dentist is often unwilling to be bound by any agreement, either written or verbal, and if a uniform fee bill has been the result of any conferences held, there are generally a few men who will not abide by it. The only solution of the first step towards the business side of dentistry is that of fees, which is the dominating factor, in my opinion, dependent on the personal equation of the dentist. If the fee is the factor engaging the attention of the major portion of our colleagues, I would call to *your* attention the fact that the *absolute foundation upon which the business side and financial structure must be constructed is the rock of technical ability;* or, in the language of the street, ''One must be able to deliver the goods.''

While the standards for entrance to our colleges have lately been advanced, I believe the near future will find other changes being advocated which will materially improve every phase of dental practice. I am hopeful of these results because a decided change is noticeable, not only in the personnel but in the quality of work produced by those classes that have matriculated since the requirements for entrance to our schools must represent a previous education equal to that of a standard high school.

Dr. Whalen has said, ''The teaching of oral hygiene is much like teaching the Gospel. It is necessary to keep everlastingly at it, unless what has been done will be lost.'' I believe that to be true, and while I heartily commend the earnest efforts put forth by those who are pushing this grand work, I sometimes wonder if we could not accomplish more in a given period if we had a course of lectures on oral hygiene by some good man in each of the Normal schools in the country; or if a simple, concisely-written text-book could be prepared for these institutions, so that we might stimulate an interest in this great subject in the minds of the Normal students who are to become the future teachers in the public schools. We could thus gain the immediate support of the young class of teachers while they were still possessed with the enthusiasm of their calling. We would find it much easier to accomplish results, because they would possess a talking knowledge free from technical terms, that would be understood by the students and parents and would not be compelled to repeat parrot-like the few facts they may have been able to glean from a talk by some member of our profession that may have contained many terms which are as Greek to the laity. At the same time a text-book for our public schools might not come far amiss. I well remember a little yellow bound volume on Hygiene and Physiology that came into the public schools when I was a youngster, how much of an improvement it was over any previous effort along that line, how I really enjoyed reading it, because I comprehended its aim; the language was within my reach.

In closing, I wish to compliment the essayist on the manner of presenting this subject, which is of so much importance to every member of the profession. He has so thoroughly covered the ground, and I am heartily in accord with all he has said, that my discussion can appear only in the light of commendation.

## REPAIRING BROKEN BRIDGES AND FACING IN THE MOUTH BY SOLDERING WITH PURE BLOCK TIN*

BY DR. S. D. RAMBO, MARIETTA, GA.

It is a very simple operation by making a small soldering iron of a large piece of copper wire, by boring a hole in one end of it, tapping this hole, then threading an old electric, root-drying needle and screwing it into the copper wire, file one end to a point, or shape it as the special case may demand and then tin this end and the instrument is ready for use. Dry off the bridge or tooth that is to be soldered, wipe it off with soldering fluid such as we use in orthodontia cases. Pack around the mucous membrane adjoining the bridge that is to be soldered, with asbestos fiber, which serves as a non-conductor of heat, turn on the current and tin the surface of the bridge or facing and then take a piece of thirty-gauge platinum plate and tin one surface of it and then place the tin surface of the platinum to the tin surface of the broken bridge, having it extend beyond the broken surfaces sufficiently to guarantee strength, secure it in position with binding wire and then turn the current on again and sweat the two surfaces together. Where there is a broken facing to be replaced after grinding the facing to fit, tin the pins on the facing, then place it in position, touch with acid (soldering fluid), put a small piece of solder over the pin and then apply your soldering iron.

In the cases I have repaired I have used pure block tin, but I think a lower fusing solder would answer just as well and would require less heat.

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*Clinic before the Georgia State Dental Society, 1913.

Would you go back and live again
The life you've just passed o'er.
With things the same as yesterday,
The change no less, no more?

# EFFICIENCY*

BY E. A. HONEY, D.D.S., KALAMAZOO, MICH.
PRESIDENT STATE BOARD OF DENTAL EXAMINERS

THE STANDARD DICTIONARY DEFINES "efficient" as *(a.)* Acting or having power to act effectually. *(b.)* Having all the power of energy requisite.

"Efficiency" is defined as *(a.)* The character of power or being efficient. *(b.)* The power that accomplishes a desired or designed work. *(c.)* The state of possessing adequate skill or knowledge for the performance of a duty or calling.

*Mech.*—The ratio of useful work or the effect produced to the energy expended in producing it.

This last definition stamps "efficiency" clearly as a relative term to be attained only in degree, to be placed not by meaning but by classification beside "Godliness" and "perfection." The work of establishing an increased degree of efficiency in any undertaking of whatever kind merely means the elimination or reduction of waste in its various forms, material, time, human effort, both physical and mental.

In order to correct an error, we must first be made conscious that such error exists. If we eliminate or reduce a useless waste we must in some way be shown the nature or extent of such waste.

One writer, in his effort to emphasize some of the present forms of waste, has the following to say:

> Man wastes three-quarters of the coal in the ground, brings the remaining one-quarter to the surface by inefficient labor and appliances, doubles, trebles or quadruples its cost by transportation charges to the furnace door. Rarely is as much as 10% of the energy of the coal transformed into electric energy and of this residuum only one-twentieth can appear as light. Ten or twenty times as much light is provided as is necessary on a writing table because of the distance of the bulb from the place where the light is needed. The light itself glows continuously not only during the intermittent work but often several hours before and after it is needed. Out of ten thousand B. t. u. in the coal mine we use in necessary light the equivalent of about six.

For years those engaged in or interested in conservation in a broad way have repeatedly brought to our attention the fact that our forests are vanishing, our water power is going to waste and that the end of our coal and iron is almost in sight. But our greater waste of human energy through blundering or inefficient acts, is less tangible, less visible, and but vaguely understood.

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*Read before the Michigan First District Dental Society, 1913.

For a good many years engineers have been busy devising means to reduce or eliminate this waste of human energy and thereby reduce the cost of production and incidentally to increase the prosperity of both employer and employe.

Mr. Frederick Winslow Taylor is credited with being the founder of that form or degree of efficiency commonly known as "scientific management" which term has been defined by one of our greatest living Americans in the following way:

> Scientific management is the application of the conservation principle to production. It does not concern itself with the ownership of our natural resources. But in the factories where it is in force, it guards these stores of raw material from loss and misuse. First, by finding the right material—the special wood, or steel, or fiber which is cheapest and best for the purpose. Second, by getting the utmost of finished product out of every pound or bale worked up. It seems to do even more for the workman. It studies him at his task. Of the motions he makes and the efforts he puts forth, it determines by patient observation which are the ones that get the result. It experiments to see whether these cannot be further shortened or made easier for him. When the right way has been worked out in every detail, scientific management sets it up as a standard for that job, then instructs and trains the workman until he can accomplish this standard and so on with all other workmen and all other jobs. The individual is first made efficient. From these efficient units is built up an efficiency organization.

Mr. Taylor in his work on "The Principles of Scientific Management" shows most conclusively by a series of illustrations that even the simplest forms of mechanical work can, by scientific means, be so developed as to increase the efficiency of the individual from 100 to 300%. The first illustration he uses to prove his claim involves the crudest form of manual labor—the handling of pig iron in the plant of the Bethlehem Steel Company. The men engaged in this work needed nothing but brute strength. They were best suited who were found to be of the type of the ox. It was found upon investigation that each man was handling about twelve and a half long tons per day. A series of experiments in which every movement was studied and timed showed that a good pig iron handler should move between forty-seven and forty-eight tons per day, provided the rest and load were properly distributed and the laborer operated in all his movements in obedience to instructions.

In this same institution were employed from four to six hundred shovelers. A scientific study of this class of work determined just what shovel load would result in the biggest day's work for a first-class man and steps were taken to secure the shovel best suited to handle the different kinds of material. It was found that a first-class man would do his biggest day's work with a load of about twenty-one pounds. When the yard of the Bethlehem Steel Company had been placed under scientific management, the result from a business standpoint may be of interest.

The number of men were reduced from between four and six hundred to one hundred and forty. The average number of tons per man, per day, was increased from sixteen tons to fifty-nine tons. The average earning per man was increased 60% and the net saving in money to the company in this department in one year was $36,417.00.

Moving up to a little higher order of work, Mr. Taylor shows what Frank B. Gilbreith, another engineer of note, has done in the work of laying brick. He made a very careful analysis and study of each movement of the bricklayer and eliminated all unnecessary movements and substituted fast for slow motion. He experimented with every minute element which in any way affected the speed and the tiring of the bricklayer. He determined the exact position which each of the feet of the bricklayer should occupy with relation to the wall, the mortar box and the pile of brick, eliminating all steps back and forth each time a brick is laid. He determined the proper height for the mortar and the brick and designed a scaffold that brought all these materials in their proper relative position. These scaffolds are adjusted as the walls grow in height by a laborer specially detailed for this purpose. In this way they were to eliminate the waste of each workman weighing on an average of one hundred and fifty pounds, moving his body down to the level of his feet and back again each time a brick is laid. To this is added the full inspection and placing of the brick with the best edge up, and much other detail. The net result being that he reduced the motions from eighteen to five. The workman who became skillful in the new method was able to lay three hundred and fifty bricks per hour as against one hundred and twenty bricks per hour under the old method and in addition to all this, a substantial increase in wages.

One of the most interesting experiments carried on under the direction of Mr. Taylor was done at the Midvale Steel Company and consisted in an attempt to find some law that would enable one to know how much of any kind of heavy labor a man who was well suited for his work should do in a day; in other words, to study the tiring effect of heavy labor on a normal man. He employed a college graduate to collect what data he could from European authorities, but no records were available from which any law could be deduced either from the literature at hand or the experiments carried on at the plant. After each man's work had been translated into foot pounds, they found no constant or uniform relation between the foot pounds of energy exerted during the day and the tiring effect of the work.

Some years later, another series of experiments was carried on with the same result. It produced some valuable information, but failed to establish any law. After a third series of experiments had been conducted, and more valuable data collected, the accumulated facts were handed over to Mr. Carl G. Bart, a very capable mathematician, who, by graphically representing each element of the work, through plotting curves, in a short time discovered the law governing the relation between heavy labor and normal fatigue. Practically all such work consists of a heavy pull or push on a man's arm—the lifting or pushing of some object which he grasps in his hand. The law is that for each given pull or push on a man's arm, it is possible for the workman to be under load for only a definite percentage of the day. The man, for example, handling pig iron can be under load only 43% of the day, each pig weighing ninety-two pounds. If the weight is reduced by one-half, he can then be under load 58% of the day, needing rest during only 42%. As the weight grows lighter, he can be under load an increased time or percentage until a load is reached that he can carry in his hand all day without undue fatigue. Beyond this point, the law seems to have no value in determining the amount of work man is capable of. It was necessary, of course, to have someone who understood this law to stand over the workman to see that the periods of load and rest were properly distributed so as to avoid the possibility of early fatigue.

In the physiological laboratories of our universities, experiments are conducted to determine what is known as the personal co-efficient of the person tested. This is done by suddenly bringing some object, usually a letter or number, within the range of vision of the subject, who, the moment he recognizes the object, has to do some definite thing, such as pressing an electric button. This test will show a great difference in the personal co-efficient of different people. With some the message is almost instantly transmitted from the eye to the brain and the brain equally quickly responds by sending the proper message to the hand. People of this type are said to have a low personal co-efficient.

Mr. Sanford E. Thompson made use of this test in his work of systematizing a factory where a small army of girls were employed in inspecting steel bearings. Four kinds of defects were to be looked for and it was necessary to detect them quickly. By selecting only those possessing the low personal co-efficient and establishing definite rest periods in addition to the careful training of each employe separately, he produced a result that was almost marvelous. Thirty-five girls did the work formerly done by one hundred and twenty. The accuracy at higher speed was two-thirds greater. The working hours were shortened from ten and a half to eight and a half hours per day with Saturday half holiday. The wages averaged from 80 to 100% higher than they formerly received. These particular illustrations have been selected for the reason that each one teaches a lesson for all engaged in any kind of work in which the waste of time and energy is of importance. The fact that the simplest form of mechanical work may be reduced to a science, the application of which makes such a startling increase in efficiency as the above illustrations would indicate, must arrest the attention of any intelligent person.

One question that may arise in the minds of many is: What was the means taken in these cases to bring about the psychical condition in the employe that would induce him to consent to the change in working methods?

This is a feature that has required very delicate handling and in some instances has called for an unusual amount of tact. In all cases the employes were taken singly and by careful explanation were assured they could do more work, more easily, in less time by the new system and in addition receive a considerable advance in pay. In some instances, after careful explanation had been made, they were allowed to take a vote of the entire department and abide by the result.

It will be readily seen then that to bring about a maximum of prosperity to both employer and employe it is necessary to establish their mutual arrangements in such a way as to make their interests identical. In other words, the cause of success must lie in the desire or determination to gratify an ambition.

Efficiency does not consist in extreme effort, but the elimination of unnecessary, undesirable effort and waste in all forms. The trained intellect must precede the trained hand. All of our efforts will be inefficient in proportion to its lack of intelligence. The major portion of our work as dentists requires the use of the intelligence gained through scientific study combined with manual dexterity.

A great deal might be said on the subject of preliminary preparation and still more on the technical training in our professional schools, our dental schools in particular. Perhaps there is something we might do to increase their efficiency. I wonder if we are doing what we can in this direction?

If it takes an efficiency engineer from three to five years to teach the employes in the different departments of a factory to do a few simple mechanical operations in the best way and convert the entire plant into a harmonious working organization, under the new system, is it any wonder that the result of three years' of study in our colleges in an effort to gain a dental education, is to a large degree disappointing to both the more intelligent student and the conscientious teacher? Just how to correct the waste in these institutions is not the province of this paper, even though the writer were capable of assisting in this adjustment.

It may not be out of place to mention at this point the vast sums of money that are being spent annually by industrial concerns through the employment of efficiency engineers in the effort to eliminate waste. One of our local manufacturers tells me that he has an efficiency man who has been with him for nearly two months and will remain for the greater part of the year at a daily wage of $35.00.

What a boon it would be to the future of our profession if the same grade of experts could be placed in our colleges so that our boys could come to the people equipped with all the benefits resultant upon intimate contact with scientific management applied to a profession or calling that has such an important bearing upon the efficiency upon the individual and the nation, as ours.

I believe our colleges in the main are doing the best they can under the circumstances, but I do not believe that you and I are using our influence as we might to increase the efficiency of these colleges nor are we making any organized demand on our legislatures and boards of regents for such recognition as will enable them to increase the training forces both in quality and number.

As to the dentist, as we find him in his office what are some of the forms of waste? One of the prevailing forms of inefficiency is a lack of enthusiasm. This condition is disastrous in every calling and the causes are so many that no attempt will be made at this time to trace them, but we will make mention of some of the conditions under which enthusiasm, when once awakened, continues to thrive.

In the first place, the daily care and discipline of your physical and mental machine must be such as to keep both in a state of perfect repair.

Second: Your office should be made as attractive to you during your working hours as your home, your club, or the golf ground during your leisure hours; and this is not brought about by what we might term a vulgar display of elaborate dental equipment, though your equipment must be complete, within easy reach at all times, kept continuously in perfect working order, and as much of it as possible out of the line of vision of the patient. The dental engine, switchboard, etc., would be better back of the chair and in a cabinet when possible. It isn't necessary to place your sterilizer in full view of your patient in order to convince her that sanitary measures are receiving their just attention. Your personal appearance, that of your office, should be many times more convincing. If your patient can enter your operating room and find the floor free from dust and the remains of a previous day's work, your bracket table, your cabinet, and every working surface clean and polished, and not so much as a mouth mirror or explorer in sight, you have contributed to the comfort of that patient, increased her confidence in you and to just that extent added to your efficiency and maintained your enthusiasm.

In the matter of office furniture, I will state it as my opinion that it should be selected with great care and be of simple design, made from a choice quality of wood and by the best workman available if it is going to continue to please you over any considerable length of time. Have just as few pieces as will comfortably meet your needs and in a general way make haste slowly.

The different mechanical movements of the dentist in the varied work he is called upon to perform is not reducible to a scientific basis. The elimination or reduction of waste is in a large degree a personal equation. If the individual has failed to increase his efficiency to a satisfactory degree, it is because he has not given that feature enough intelligent thought.

The case of the bricklayer was mentioned to illustrate the amount of waste possible through a haphazard arrangement in which the position of the chair and the operator in their relation to the balance of the equipment has not been carefully planned. It is by no means uncommon to find a dentist who, though very busy, through ten hours a day or more, considers it to his interest to interview all who enter his waiting room, answer all telephone calls, responds to the summons whenever a dental supply man is announced. There is no sense or reason in a busy man robbing his patient by giving time to any of this. If your assistant cannot and does not make your appointments, collect accounts, audit and pay bills for supplies, keep account of the needs of the office in its many details and thereby contribute in a real sense to its efficiency, the fault is all yours, not hers. If she is not capable of this quality of service, better change. Don't think for a moment that because your name appears on the waiting room door that the success of the office is all due to your efforts. If it is, I guarantee that it is much less than it should be. You, as a dentist, are only one element in the organization. If co-operation is lacking between operator, equipment, assistant and patient the net result will be in keeping with this deficiency.

The basis of all efficiency either in the individual or the organization is discipline. Those interested in the kind of discipline that really counts should study a book written by Arnold Bennett entitled "The Human Machine." The author in a decidedly unique manner has painted some very vivid pictures of a few of the more common human weaknesses and has shown how these may be overcome through a course of mental discipline of a decidedly high order. Read it. The dentist who failed to make a good jacket crown or a perfect fitting inlay on an accurate amalgam model the first or second time he made the attempt did not prove that the principle was wrong; if he proved anything it was the fact that success does not come by chance. A careful review of the different steps after each failure, if studiously followed out, should soon eliminate his mistakes. It is not the length of time spent in any given operation that is of importance. It is the certainty that it was necessary to bring the desired result. It is not fair to charge up to your failures the conditions under which you work—if these conditions are not what they should be, make them so. The young man who is anxious to bring about conditions in his office that would enable him to work with greater ease and convenience and produce a better result in less time should understand clearly that this is not accomplished by the purchase of a mass of appliances. Equipment in excess of your needs should be avoided. Make such changes or modifications in your working environment as are indicated by easy stages but as Lincoln said, "Keep pegging." In a surprisingly short time an appreciable change will be made.

The dentist who once each week will seek to correct some one feature in his office that offends him will soon be saving time and effort and in addition be doing better work for, with the advance in his ideals, he will cease to tolerate the defects that he failed to recognize previously. Much time might be saved if we would learn to classify our work after some method similar to the classification of malocclusion by Dr. Angle, so that under all ordinary conditions a brief examination will decide what is indicated—a porcelain inlay, gold inlay, crown or what not—this, carefully applied, will in time develop the "personal co-efficient" mentioned in the early part of this paper.

The man who is working under a high nervous tension is wasting much energy. He is carrying too heavy a load—use all the effort needed for the work in hand and no more. Study the tiring effect of your work and aim to reduce it.

No law could be easily deduced that would determine how many hours per day a dentist should work but I believe in a general way the working period should never exceed eight hours and in very many cases seven or six would better suit the physical possibilities of the individual Shall our conception of efficiency begin and end with work? By no means. I state it as my opinion that one of the greatest problems before the American business and professional man today is the problem of play. We have all learned to work after one fashion or another, but in the matter of play our efficiency in the majority of cases is low. The man who spends a couple of half days a week on the golf grounds or an occasional day or week on a fishing or hunting trip will find at the end of the year that his bank account has not seriously suffered--if it has, he has usually had his money's worth. If you have not already learned to play in the open air begin now. Apply some of the discipline acquired in your office to the problem of systematic recreation. Don't wait too long. There is much more enjoyment in play to maintain your efficiency than there is in enforced recreation in an effort to restore it. The developing of a real enthusiasm for some form of wholesome healthful pastime will broaden your sympathies, increase your optimism, make you a more agreeable and intelligent companion, a better dentist and a more useful citizen.

## DISCUSSION.

**Dr. Henry C. Raymond:** A copy of Dr. Honey's paper was handed me at eleven o'clock last night as I was leaving the theater, with the cheerful news that I would be expected to discuss it tonight.

I had been enjoying a play with the alluring title of "The Road to Happiness," and was thinking of how I would follow out the philosophy of the hero by always meeting trouble with a light heart and a smile, when I stubbed my toe against this discussion news.

Being a slow thinker I require more than twenty-four hours' notice to discuss this paper on "Efficiency," a subject to which few of us have given much, if any, thought. I must, however, express my appreciation at the able manner in which this important subject has been presented.

Those of us who know Dr. Honey well, know that he is well qualified to speak on Efficiency, for he has given much attention to system and right method in his practice, and so is able to maintain a high degree of conservation of energy. He gets the maximum of accomplishment from a correct use of the means at his disposal, which to me seems the highest degree of efficiency.

The essayist's remarks in reference to operators leaving the chair during operations to see callers or to talk over the telephone are important. I know of nothing that will mar our efficiency to such an extent as that practice. It is impossible for an operator to achieve the best results in his work who leaves his patient several times during the operation, as many are in the habit of doing. His mind is taken off his work, and every time he returns to the chair, time is lost while mental readjustment is taking place before he can proceed with the operation. Besides the loss of time, operations done under such conditions are seldom as good as they would be if the operator confined himself to doing one thing at a time. Concentration, so necessary for successful results, is impossible, and efficiency under such conditions must be almost an unknown quantity.

The writer's remarks in regard to our getting the service we are entitled to and which it is possible to get from our assistants, I thoroughly agree with, for frequently much of the inefficiency in our offices comes from doing or attempting to do that work which properly belongs to the assistant or office girl. I believe one of the greatest factors governing the value of men of high standing in mercantile or manufacturing business is the ability to get out of others the service that is due from them, and if we take up our time in doing that which we employ others to do, our efficiency will certainly be of a low standard.

There is much in the paper that is of great value to us all, something for us to seriously think about, and I wish to thank Dr. Honey for starting our thoughts along a line that is new to most of us.

Dr. E. B. Spalding, Detroit: When your program committee was planning for the May meeting, Dr. White, our President, suggested that we ask Dr. E. A. Honey, of Kalamazoo, to give us a paper on Efficiency. I am sure we all agree that the suggestion was a most happy and profitable one.

When I wrote Dr. Honey inviting him to prepare the paper for us he replied: "Yes, I will do it for I will get more out of it than you will." That is a fact which we all ought to realize, when a man prepares a paper or clinic for a meeting that *he* becomes more proficient and efficient thereby than those who listen to his effort. If Dr. Honey has gotten more than we have we are glad for he has given us much of profit to think about.

Those of us who have known Dr. Honey for several years know that efficiency is not a hollow term with him but he is applying every day the principles in his work that he has advocated tonight. By these same principles Dr. Honey has built up a dental practice in one of the smaller cities of Michigan which for high standard and quality of work and genuine esteem of a large number of patients is one of the best in the state.

I think it safe to say none of us are working without expending much more energy than is necessary and with less accomplished in a given time than we might, could we have an efficiency expert study our needs. I presume every one who has listened to the paper tonight has consciously, or unconsciously, at least one scheme or principle in his work which would help many others of us could we know it and would we adopt it. The man most efficient is he who has studied out the greatest number of concise and direct methods in his work.

One great help to me in my practice is the consultation hour. In 1902 I decided I was wasting much time by allowing patients to drop into the office for examinations at any time which suited their whim, and interrupting me during my regular appointments. I therefore decided upon one hour, from 12 to 1 o'clock, every day for a consultation hour for examinations and short treatments and refused to see those who had no appointments except at that hour. The result has been that I have been able to do more and better work and the freedom from interruptions is very much appreciated by the patient who is being operated on. The secretary or assistant also can answer nine out of ten telephone calls without annoying the operator.

Dr. Honey has said that efficiency is developed by enthusiasm. I want to say that one way to develop enthusiasm is to have proper equipment for each operation we have to do. New instruments make us interested in the operation for which the particular instrument is adapted because we can do the operation better than if we are trying to use an instrument made for another purpose. We are naturally enthusiastic over the thing we can do well. It is false economy not to have proper tools.

The arrangement of our instruments so as to be always found in the same place in our cabinets, with the least amount of time expended in their selection, is of great importance. For a number of years I used to keep my excavators in two drawers in my bracket table. When I wished a certain chisel or spoon excavator I had to look over twenty-five or more instruments before the right one was found, consequently much time was lost and annoyance was experienced.

I learned at a meeting in Chicago a method of marking the handles of a set of instruments so they can be arranged on a tray or in a drawer of a cabinet and be readily replaced in the same order by an assistant. Since arranging my excavators and other instruments in this way I save much time while operating. The arrangement of instruments to be most convenient is a subject for study by each individual according to his own methods of working.

The training of an assistant to do many things which relieve an operator is time and patience well spent and increases our efficiency very materially.

I want to thank Dr. Honey for awakening me to the importance of studying my own methods and I hope to improve my efficiency.

Dr. A. L. LeGro: Dr. Honey's paper is a splendid example of efficiency and comes at an opportune time. It has opened the way for much thought and reflection and during the reading of the paper and especially during the discussion, my mind, in an attempt to fix definitely upon the elimination of waste and possibly its most practical solution, has floundered around in a sea of conflicting emotions until now, when I am before you, gentlemen, to discuss the paper. I marvel at my presumption to tackle the question, so complex and with so many angles, that it seems impossible to do more than just get started. However, so little has been done by most of us in the way of increasing our efficiency that the possibilities suggested to us by the essayist interest me tremendously. I have known Dr. Honey for many years; have been associated with him on the Board of Examiners; as an officer in dental societies; have been entertained many times in his home and spent hours in his office and I know that ''efficiency'' is his middle name. He has given me many good words of advice and instruction during the past twelve years and has always seemed most eager to accept and put into practice any idea suggested that could possibly help to perfect the efficiency and system of his working forces. Practical demonstration is what counts and it is a pleasure and inspiration to see Dr. Honey conduct his practice. He puts into practice what he preaches and his paper therefore carries greater weight in my mind.

Efficiency, we are told, is ''acting effectually'' and to act effectually we must first fortify ourselves with the necessary fundamentals of action, physical and mental. Physical condition is the very rock on which efficiency must stand or fall and right here, being but ordinary mortals, being intensely human, etc., the great majority of us are making our one big mistake. Intemperance in eating, lack of exercise, long hours, etc., lead only to one road eventually and that is the road of least resistance. There is no such thing as efficiency along this path. I would therefore lay emphasis on the necessity of dentists taking more recreation, eating less meat and getting out into the open often that the sunshine may get into their hearts and souls as well as their skins, for upon the physical condition that will accrue depends their mental attitude which in turn gives them the enthusiasm necessary to increase efficiency. One of the best things in the paper tonight was the sentence ''There is more enjoyment in play to maintain your efficiency than there is in enforced recreation in an effort to restore it.''

Granting that we are in good physical condition, possess the right mental attitude and therefore enthusiasm, let us note a few procedures that will eliminate waste of time that we may act more effectually.

For many years in my practice, I practically made a thorough examination of every mouth each and every time the patient presented himself for treatment. If it took six sittings to complete the necessary work in a given mouth, I found myself examining that mouth thoroughly six times and asking the patients many questions to refresh my memory as to just what was done during the last visit of patient. All this took time and did not in some cases tend to impress the patient that I had the case as completely in mind as I should.

What is termed our ''blue-print'' system in my office has corrected all this and increased my efficiency considerably. I will describe it as briefly as possible. The patient is seated in the chair and prepared for examination. Usually one-half hour is given up to this examination and sometimes as much as an hour. My assistant takes down on a charted card (large) a description of the work I propose to do. The work is all outlined, described and diagrammed in the order in which I expect to do it. A liberal approximation of the necessary hours and the outlined work for each hour is then made in a place on the front side of the card and immediately under diagram, for this purpose, shades of Superior Centrals and cuspids from at least two shade guides are taken for future reference and detailed notation of shades for porcelain work. The result of my examination is put on extra large stiff cards, kept in special index for this special purpose. I have in mind the number of each tooth and when my assistant finishes my ''blue-print,'' a sample of the distribution of work for a given case may appear like this immediately under the diagram:

1—Meaning 1st hour.

1—Prophylaxis.

2—N. Devital. No. 9 Prep. G. In. No. 4 Dis. Sep. 5-6 (silk)

3—G. In. No. 4 Dis. Sep. 5-6 (silk)

4—Pulp X & Anodyne Prep 5mes. Por. In. Impres. No. 5.

5—Root Filled No. 9 Por. In No. 5 M. Ins. Prep. 6 M Por. In. Imp.

6—Moss Fibre No. 9 Lin. Por. In. Ins No. 6M.

At the first sitting after the examination which I designate as the first hour at the start of my work, I turn to my cabinet on my right and at my elbow I find my ''blue-print'' card which my assistant has placed there immediately following the preparation of the patient for operation I notice 1—Prophylaxis—and proceed immediately to follow out my own instructions for that hour. At the next sitting after the patient is seated and prepared, from my natural position at the chair, I turn slightly and again find Mrs. John Doe's card with the first hour checked off and I proceed with my own instructions for this hour. If the hour is not long enough for the completion of work that I have outlined, it is not checked and is taken up immediately at the beginning of the next hour. In the second hour of the illustration you notice a treatment is involved so one of the many lines on the opposite side of the card is used for an item such as this:

May 1st No. 9 Dev. Fibre (sealed) Calxine.

At a glance at the card I know when this was done and all treatments and materials are recorded in that way. I have laid out a six hours' schedule to complete this particular work of Mrs. John Doe's and in practice that amount of work would undoubtedly be done and the patient dismissed. The card is then put in the finish column and rarely referred to again until after the next examination. The greatest amount of thought in most cases is done during the examination hour and the index system thinks largely for me after that.

# MAKING GOLD INLAYS*

BY DR. THAD MORRISON, ATLANTA, GA.

Shape your cavity as you would for any gold inlay. Take modeling compound impression of tooth and cavity, chill and remove, then mix True Dentalloy very soft, and work into impression, let set; remove modeling compound and you have the crown of tooth and cavity in same duplicated in amalgam. Coat the surface of cavity in the amalgam model with cocoa-butter so your plastic gold will not stick. Now take a piece of Alexander plastic gold sufficiently large to fill the cavity, work it into the most convenient form to place into the cavity and force down into it as well as you can with your fingers; then take flat burnisher and force it hard and burnish your margins thoroughly; trim off all gold which overlaps the margins. Now remove the plastic gold model from cavity with fingers, and replace into cavity. If it sticks, stick an excavator into plastic gold and remove, then replace and fill in the little opening made by excavator with a little plastic gold and burnish with warm burnisher. Next take clean glass borax slate and rub borax and a little water into thick cream borax; now cut your 22-k. gold solder and drop into this cream borax. Mix a little of S. S. White No. 4 Inlay Investment Compound, and drop a little bit on a piece of pasteboard; drop a small wire ring around the top of the little bit of investment, and take your plastic gold inlay; model with your foil carriers and force down into this bit of investment till you have covered well all your margins, leaving only a small surface of your plastic gold model exposed. Allow it to stand three or four minutes; then take a small piece of your gold solder, well coated with cream borax, and place in opening of investment and in direct contact with plastic gold model; then stack the remainder of your solder on top of this piece and place investment on soldering frame over gas or gasoline burner and allow to heat slowly till wax binder burns out of plastic gold, which you will readily notice as it will blaze; then apply your flame from your blow-pipe in connection with flame from gas or gasoline burner from the under side of the investment (also you should have placed over the investment wire screen to keep the heat in). Keep increasing the heat, keeping the investment in the center of the heat-zone, till you see the solder flow; then remove your heat at once and let cool till you can hold in your hand; then take out of investment and replace in the amalgam model. Grind off any excess gold or do any trimming you see it needs, then set in tooth and finish up as you would any other gold inlay.

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*Given as a clinic before the Georgia State Dental Society, 1913.

# OFFICE EQUIPMENT*

BY C. B. MOTT, D.D.S., ATLANTA, GA.

In discussion of this subject, I feel it one of the most urgent needs of the dental profession of the day to be prepared to operate in the mouth. First of all to be considered is absolute cleanliness, and to have this, office supplies must be thoroughly aseptic, individual cups, linens, etc., all of which can be secured from any dental supply company. These as well as sterilized instruments, mouth mirror being kept in antiseptic bath, insure for the operator successful work as far as cleanliness is concerned.

Next to be considered is the dental chair. I think we will all agree we can do better work for the patient who will relax. How can the patient relax in the dental chair of today? Try it and you will be convinced. The chair is so arranged that the shock of every instrument is felt throughout the whole nervous system. It should be possible for a chair to be constructed that it will support the whole body comfortably and when patients use such a chair, they will relax naturally. My ideal chair would support the body comfortably and place the patient in a proper position for the operator. This could easily be accomplished by a better construction of upholstering. This will help very materially to relieve the shock to the nerves.

Then of no less importance than the two subjects mentioned, we must consider that unless the modern dentist is equipped with good instruments, by this I mean those that enable the operator to accomplish results with greatest ease to both the patient and operator, he cannot successfully operate.

It is needless to suggest to this intelligent body of professional men, that the operator is the most important part of the office equipment. His manner should be bright, cheerful and sympathetic. His clothing and person must be absolutely clean, just as the successful surgeon would prepare for an operation. Unlike the surgeon, he must operate with the patient observant of the slightest neglect. So let us most seriously consider this question of office equipment and be better prepared by simplicity and cleanliness to relieve the patient and wage the war so valiantly fought now against germs and disease doing all the dentist can do for suffering humanity.

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*Read before the Georgia State Dental Society, 1913.

# THE USE OF SPLINTS IN PYORRHEA WORK*

BY WM. CRENSHAW, D.D.S., ATLANTA, GA.

PYORRHEA WORK DEMANDS of the operator who essays to do it, not only the ability necessary for the performance of the work, but a skill that shall be able to devise means to special ends in the matter of splinting; because the conditions requiring the splint vary with almost every case.

The first and most important end served is in enabling the operator by means of the splint to so study the tooth as to get the necessary surgical work done without dislodging it, or so weakening its attachment as to render it unable to survive the operation. Secondly, the process of repair in the tissues surrounding the tooth—the filling in of new tissues—is aided and made more certain. The writer assumes therefore that splinting is the first step, i. e., if it is to be employed at all, to avoid injury to the newly-forming tissues, which will result in injury if the splint is not applied before the surgical work is done; because healthy granulations set up within a few days after the operation is done, and to be permitted to elaborate into normal tissues, the tooth must be free from disturbing causes such as are brought about in shaking up the newly-treated tooth, disturbing the rest it should have.

Healthy granulations can no more develop into normal tissues under these conditions than can a young, tender plant that is constantly moved about in its setting in the earth. So that the splinting in such cases as require it, is the first step.

Splinting, improperly done, either for the lack of strength or in plan or location of it, may defeat the performance of complete surgical work, or of proper attention afterwards, and when this is allowed to be the case a failure may be expected from this cause.

The most successful splinting for a simple loose molar or bicuspid, when we have a case of this kind between two tight ones, is the insertion of a cast filling splint extending from the one tooth across the separation into the other. This particular form is best because it is less in the way of the operator in the doing of the surgical work, and is stronger, and if the operator has looked carefully to this feature of the work, it is neater and easier of execution. It is also less in the way of cleaning with the brush afterwards.

In the instances where long spaces occur with a pyorrhea tooth at one or both ends of such space, the best form of splint is the bridge; and this should be so constructed that the shell crowns, if they are used on the piers, should not extend beyond the gum. The crowns stop before passing over the bulge of the tooth.

The writer deplores the method of projecting crowns beneath the gum. Barely to the gum is permissible if the edge of the crown fits the tooth and is beveled or feather-edged at its termination. But to project them, as instances show, from an eighth to one-quarter of an inch under the gum furnishes a most fruitful cause of pyorrhea. In view of the abuse of this practice, the shell gold crown used in this way is a menace to the well being of the mouth and teeth. Splints must be arranged with reference to neatness, cleanliness, and be out of the way of the operator and the toothbrush.

The front lower mouth, including often the canines, is the most frequent place for permanent splints. The best method for doing this that the writer knows of is to cut V-shape grooves along and through the cutting edges—from one corner of the tooth to the other, and on through the number of teeth to be embraced in the splint, and drill two small holes, 20-gauge, in line with the long axis of the tooth next the corner about 3-32 of an inch deep. Take an impression of the teeth in plaster and run a Melotte's metal die, and burnish or swage a piece of 120-gauge gold. After the gold is swaged to this die, take it to the mouth and burnish it to a finish on the teeth and perforate it over the pin holes. Cut iridio-platinum wire pins, from the gold and platinum wires, of 21-gauge, such as are used in regulating appliances and slip through the perforations into the holes, of sufficient length to go to the bottom of these anchorage holes and stand up high enough to catch in the wax, which is now put in place and pressed firmly down on the pins and on top of the swaged gold and taken off. Invest the exposed side, catching the pins in the investment. When the investment is set, remove the wax and fill the gold trough level with 18- or 20-k gold solder. Fit and cement this in place and then polish down to the edges of the teeth. leaving only the V-shaped trough leveled with the gold solder. This device—less in the way of the operator in his surgical work and less in the way of the patient for cleaning—is the strongest possible fixture, because it engages and holds the teeth at the cutting edges—the point farthest from the bony investment of the root.

The wire splint may be used anywhere in the mouth where there are to be found firm fixed teeth either side of loose teeth. To do this, take a cable of No. 24 copper wire, carried horizontally, encircling the teeth of whatever number with the ends twisted together and turned in between the teeth; with loops of No. 26-gauge cut in two-inch lengths, slipped between the teeth under the cable, and brought over the cable and twisted together, cut off the ends and turn in between the teeth, making the wire splint. The wire splint, however, is unsatisfactory since the teeth yield to whatever pressure is exerted, and become loose again, and is in the way both of the operator for scaling and afterwards the patient in cleaning the teeth.

# THE EFFFCT OF NASAL RESTRICTION ON GUINEA-PIGS, RABBITS AND DOGS.*

## THE RELATION OF THIS INFLUENCE TO CONTRACTED DENTAL ARCHES, MAXILLARY AND OTHER SINUS DISEASE, TROPHIC CHANGES, MENTAL, NERVOUS AND GENERAL DISORDERS.

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(*Concluded from page 910, November Summary*)

The different forms of these affections bear the names of their first observers as *Duchenne type,* pseudohypertrophy, and apparent disproportionate increase in the size of the muscles usually beginning with the calves of the legs, which is rarely an increase of fat cells with atrophy of muscular fibers. The *Erb type* of juvenile dystrophy usually beginning between the ages of twelve and sixteen, affecting primarily the muscles of the shoulder, which become hypertrophied but weakened, and by gradual progress affecting the muscles of the body. *Landouzy-Dejerine* dystrophy also usually developed in early childhood, but occasionally appearing in adults. Its principal feature is muscular atrophy of the face which begins with the orbicularis oris, extends to the risorii, to the levator menti, and to the other muscles of the face associated with the mouth In consequence the lips cannot be firmly closed, the mouth is habitually open with the lips projecting forward, the so-called "Tapir Mouth." Quite naturally there is more or less difficulty in speech, control of saliva, drinking, and other acts which depend upon the lips. There are no fibrillary twitchings, no disturbance of sensibility, and there is gradual decrease of mechanical muscular excitability.

Granting that the dogmatic classification of these cases under any of the several forms of muscular dystrophy would be to some extent unwarranted because of incomplete history and diagnosis it is nevertheless true that factors leading to irregular or imperfect development in other divisions of the body can in like degree be influential in making for irregular development of the jaws and face. Again it is equally true and fully demonstrable from innumerable cases in practice, that with proper expansion of the palatal arches by separation of the upper maxillae at the median suture, and the widening of the nares invariably following this procedure the first result is an improvement in nasal respiration and increased healthfulness of intra-nasal tissues, with attendant marked general improvement of health, nervous and other governing influences. When supplemented by proper form of the dental arches and correct occlusion of the teeth, it gives at least reasonably good promise for the betterment of developmental influences. We have, therefore, in the region of the mouth and jaws not only an index of individual tendency to imperfect or asymmetrical growth, but a promising opportunity for directly benefiting predisposing conditions, and this is certainly worthy of consideration in every instance.

Without doubt many cases which dentists treat for the correction of dental irregularities are merely expressions of some more general affection. Although the regulation of the teeth does have a wider beneficial influence than is usually contemplated when such procedures are undertaken, a more general examination of the developmental conditions of such patients would undoubtedly lead to detection of many diseases at an early stage when curative measures could be successfully applied and the influence of mouth treatment be much extended in its beneficial aspect.

Just where the line of demarcation should be drawn in every instance between muscular atrophy which notes the beginning of progressive condition that may be expected to lead on to paralysis and one of such character that its progress will be arrested in natural course without necessarily causing a state of helplessness and endangering life is often difficult to decide. It must also be more or less a matter of speculation when the progress of disease has ceased during treatment with apparent restoration or increased usefulness of the affected parts, to determine just how much or how little the actual remedial intervention may have accomplished but the indications in such cases seem to warrant the following conclusion. (1). The centers governing trophic changes, especially when these show pathological alterations in the region of the face and jaws may be directly benefitted by maxillary separation, which, as already stated, relieves nerve tension and compression in the region of the jaws and teeth, widens the nares, and thus makes possible better respiration; (2). In young persons it is only reasonable to expect the effect of expansion in the lower regions of the face to favor also greater freedom of growth in the higher structures at the base of the skull in which are situated the larger foramina through which the cranial nerves and their important accompanying vessels emerge, compression of any one of which would be capable of causing both local and general disturbance of far-reaching character; (3). It is not impossible for this influence to extend still higher until it could affect the form of the sella turcica and thus reach the hypophysis which is now recognized as an influential factor in abnormal growth. The examples shown in the stereopticon slides appear to be dental and facial irregularities of development of not uncommon type, yet further study of their histories and symptoms reveals the fact that they probably deserve to be recognized as closely related to if not actually forms of muscular dystrophy. The results of treatment are apparent in both general and local improvement and in all of these cases the testimony of the reports of the physicians and rhinologists by whom they were referred verifies this conclusion.

## DISCUSSION.

**Dr. F. M. Casto**, Cleveland: I wish to commend Dr. Brown for the beautiful, interesting and scientific presentation of this subject. I wish also to congratulate the society for having Dr. Brown present this subject. The subject is, as Dr. Brown has clearly demonstrated, an exceedingly important one to the general welfare of the people, and one, the presentation of which is most appropriate at this time.

It is rather presumptuous for me, under existing conditions, to attempt to discuss such a scientific paper, because I have had no opportunity to study it or even carefully read it, as a copy reached my hands only this morning, and it certainly is not justice to a man or society or, in fact, justifiable at all, to discuss a paper of this nature without some thought and deliberation.

I do not wish to criticise Dr. Brown, for I can readily understand his position in the matter; however, with your kind indulgence for a few minutes, I will attempt to emphasize some of the things that Dr. Brown has presented, relative to the experiments of Dr. Anderson, of Detroit (now deceased), which were presented before the American Laryngological, Rhinological and Otological Society at Atlantic City in 1909. There were many things of interest brought out by Dr. Anderson. In the case of the guinea-pigs, it was found exceptional for a pig to live more than 36 hours after the nostrils had been occluded; some died within two hours after the nostrils had been closed. The average life of the pigs with only one nostril closed was about 29 days. The rapid death probably was due to the peculiar anatomical construction of the throat of the guinea-pig that inhibits mouth breathing, and causes the air to be swallowed, thus greatly disturbing the stomach and bowels.

The average life of rabbits with one nostril closed was about forty days. In these cases there was a gradual and uniform loss of weight, the animal dying when the weight was about half lost.

There were two important factors in explaining the cause of death. First, infection as the result of lowered resistance. Second, acute dilatation of the heart. The heart showed dilatation after two or three days as when compared to animals that were not operated upon.

Dr. Anderson's experiments relative to the effect upon dogs after closing the nares was quite interesting. He found considerable difficulty in closing the nostrils completely. Because of the strong attempt of the dog to breathe through the nose the sutures would often be more or less broken out. He would succeed quite often in closing two-thirds or more of the nasal spaces. In a comparatively short time, after the closure of the nostrils of dogs that were perfectly normal physically, they began to show signs of physical distress. The hair would become shorter, thinner, lighter in color and finally lost entirely over various parts of the body. With the change of the hair, a peculiar wrinkling of the skin took place.

In a number of cases after the dogs were in a bad physical condition, and in fact would probably have died within a short time, Dr. Anderson removed the nasal obstruction and there was an immediate improvement, and the dogs regained their normal health very soon. This experiment was important, as it showed the vicious effect of mouth breathing and the quick recovery to normal after the nasal breathing was re-established.

Another significant thing is the fact that the resistance to disease, etc., was much greater in older than in younger dogs.

The effect of nasal destruction upon the progeny was also very interesting. Of twenty-four puppies born of mothers having about one-third normal breathing space, two were found dead, three died within 24 hours, eleven died at intervals of 30 to 90 days. One died of distemper on the 99th day. Three were used for experiments, so they are excluded. Two had nostrils sewed up; one of these showed practically no resistance to disease at all, and soon died. Two were still living at the end of 114 days, but were very poorly developed, although they had the best of care taken of them.

Pups born of mothers with constricted nares showed much less resistance than puppies born of mothers whose breathing was normal.

Dr. Anderson concluded that interference with normal breathing of dogs or rabbits has a marked deleterious effect upon the progeny.

The history of two dogs with the nostrils closed is interesting. One, a puppy, failed to develop normally, became almost a physical wreck. The hair became gradually thinner until at last it was lost entirely. Death seemed imminent. At this point the nasal plugs were removed. The puppy showed immediate improvement and very soon was in apparently a normal condition. The second dog, a female, had its nostrils closed. She degenerated physically the same as the puppy—her breathing was strongly suggestive of asthma and emphysema. Suddenly she appeared to grow better, when upon examination, it was found that one of the nostrils had torn open. She then became in heat for the first time—puppies were born soon after. All seemed normal, but failed to develop and very soon became degenerated physically and died. They were well fed and properly cared for.

Do not these experiments of Dr. Anderson mean a great deal to us? And is it not reasonable to suppose that if such serious and vicious phenomena occur in the lower animals from nasal obstruction, that similar effects would be manifested in a modified form in the human family? The orthodontists practically always associate certain types and forms of mal-occlusion with nasal troubles. There remains no doubt in the minds of the orthodontists of today that grave deformities of the jaws and bones of the face result from nasal obstruction.

It is a common occurrence, in fact, the rule, in such cases, to find the patient at a very low ebb physically, and it is just as true that the patients are greatly improved in every way when proper nasal breathing is established and a proper orthodontic operation performed.

One word regarding the operation that Dr. Brown speaks of, that of opening the median or true maxillary suture by rapid operation of an appliance. I wish to say that sufficient proof has not as yet been produced to convince me that the median or maxillary suture is actually opened in very many of the cases or that such an operation is indicated in any considerable number of cases. I wish also to state that the establishment of the correct occlusion of the teeth is the most important thing in the sphere of the orthodontist and is the most difficult problem to solve. That the establishment of normal occlusion in young patients, thus giving them a correct masticating apparatus, is a most important factor in the proper growth and development of the jaws and other bones of the face, and in the production of the normal breathing spaces.

I desire to thank Dr. Brown personally for his very good and timely paper, and I feel sure that the original research work that he is now engaged in will be of inestimable value to the profession and laity alike.

Dr. Henry E. Germann, Cincinnati: Our society is indeed to be congratulated upon being able to obtain as essayist a man so distinguished in his profession as Dr. G. V. I. Brown. He has spent many years of untiring effort on the subject which he has presented to us today, and his research work along these lines has gained for him an international reputation. The dental profession and the rhinologists shall be forever indebted to him for his contributions. It was my pleasure to spend a week with Dr. Brown in his office, and I there saw a great many cases and evidenced many corrections of the evils which he has this afternoon proven to be the result of mouth breathing. I am in no position to do his paper justice from the viewpoint of actual discussion, for while I should very much desire to do some of this research work, I feel incapable of carrying on the same in a scientific way.

A number of these cases of arrested development have been referred to me, and I shall make a few case reports, which will probably be of interest to you.

*Case No. 1.* A young man of sixteen years, who at the age of six years had his tonsils and adenoids removed. This was done by a very competent rhinologist, and was complete. The boy had chronic bronchitis and asthma, and there was little relief after the operation. He was obliged to spend the winters in the south, and even the slightest exposure in the summer would excite these attacks. He was a chronic mouth breather. Much was done to change this habit, but owing to arrested development and pushing forward of the anterior teeth, it was impossible to make him breathe through the nose. (Slides shown, Fig. 1 and 2.)

When examined, in 1910, there was found a very much deflected septum in contact with the outer wall of the left nasal. The palatal vault was high and the arch constricted; the vertical dimension of the nose below normal; the right fossa was also very narrow, and it was decided that no amount of intra-nasal work would establish sufficient space for nasal respiration, so a rapid separation of the maxillary bones was decided upon. The appliance used was the one advocated by Dr. G. V. I. Brown, and was placed on February 18, 1911. The tension was begun the next day. On the fourth day there was absolutely no difference in the position of the central incisors (slide 3 now shown). There was immediate notable improvement in nasal respiration; tension was gradually carried on until sufficient separation was obtained to allow patient extremely easy nasal breathing. On March 10 a retention plate was placed. From the time of the separation of the central incisors there seemed to be a gradual straightening of the septum, and within the first six months the boy gained twenty-two pounds, and was able to join with his companions in all sorts of athletic work, and as he was fond of swimming, reported that he could swim for a greatly lengthened period, and with much more ease than when he was a mouth breather. The chronic bronchitis and asthma have left him completely at this writing, and he is rapidly developing into manhood, and his parents are relieved of the thought that he would be a chronic invalid.

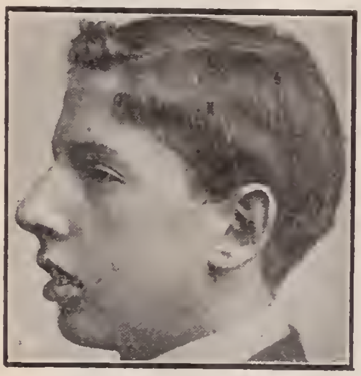


Fig. 1

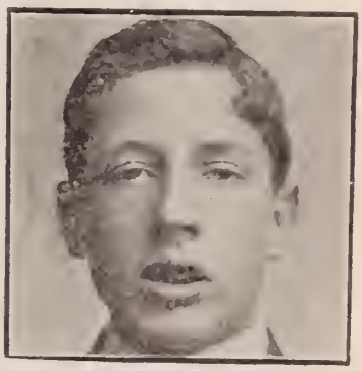


Fig. 2

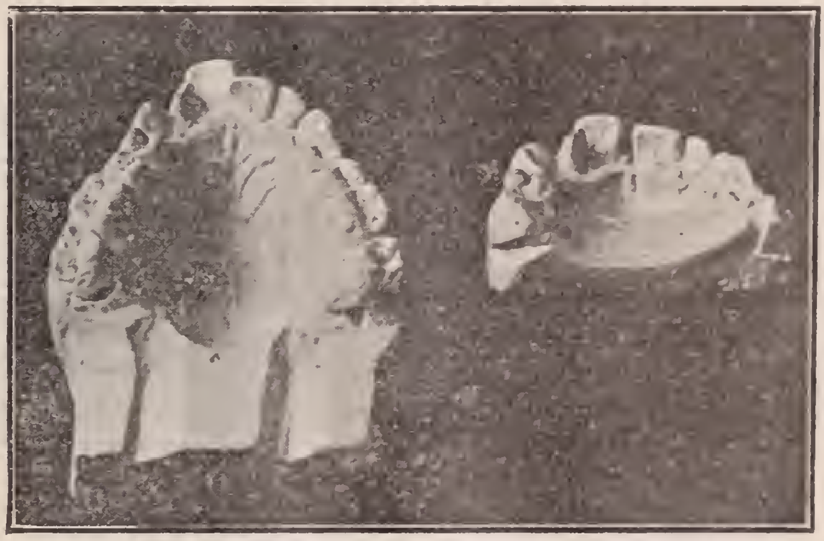


Fig. 3

*Case No. 2.* A lady of twenty-six. The history of this case is not quite so complete, as we simply have the patient's word for her previous condition. As near as we could find, she had been troubled with adenoids and tonsilar growths up to the age of six, and had been a chronic mouth breather. Also subject to recurrent colds. At this age the tonsils were clipped, but no further operation. She continued, of course, with her mouth breathing, and at the age of twelve she was taken to a dentist for orthodontic procedures, and unfortunately, four teeth in the upper arch and five in the lower were extracted. With this terrible sacrifice, and extreme will-power, she did finally breathe through the nose, but the slightest exposure would bring on a cold and compel her to do all of her breathing through the mouth. The patient was not sent for the purpose of maxillary separation, but for re-adjustment of the arch, as her dentist felt that should she eventually lose her teeth, the vault would be very unfavorable to her wearing a denture. In view of the fact that the nasal fossa, both right and left, were small, it was deemed advisable to attempt a separation in this case, and the picture as presented will prove that he was not in error. (Slide.) You will notice that the original model shows considerable over-lap of the central incisor, and the model 20 days later showing about four mm. separation. The appliance was placed on May 8th, tension applied the next day, and in twenty days' time we had the separation. The nasal stenosis experienced by the patient upon catching cold has been entirely eliminated. She sleeps with her mouth closed, and makes the statement that the benefits received are very gratifying.

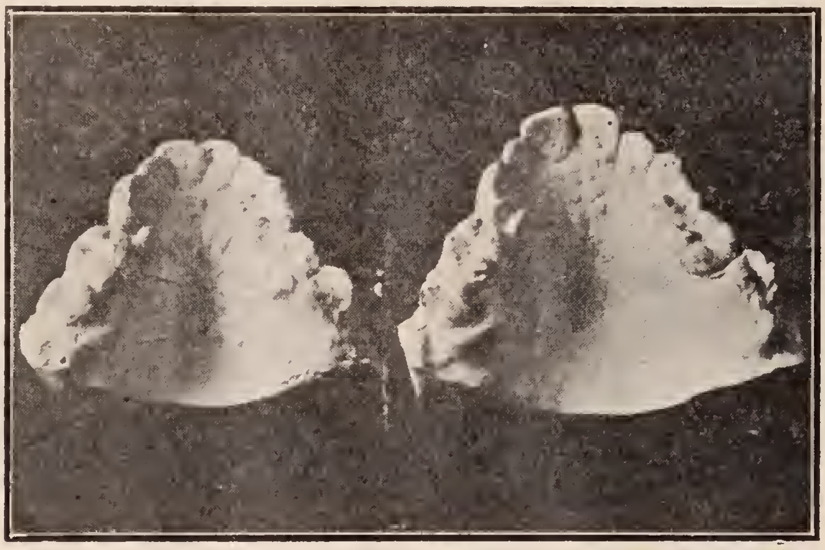


Fig. 4

Fig. 5

Fig. 6

*Case No. 3.* This is indeed a very interesting and remarkable case. Age 15. Slides 5 and 6 show the arrested development of the face, slide No. 7 the relation of the jaws and teeth to each other, 8 and 9 the terrible condition existing in the lower jaw. (Slides numbers 5, 6 7, 8 and 9 are shown.) The nares were narrow and contracted; turbinates normal but the rest of the septum was considerably exostosed, especially on the right side, being in contact with the outer wall of the nose. In the past three or four years she has suffered continuously with headaches, and recurrent colds, together with a constant stinging in the upper part of the nose. The rhinologist in the case was of the opinion that no amount of intra-nasal work would produce the desired result, and she was referred to me, and it was decided that rapid maxillary separation would relieve this constant pressure in the nose, and also eliminate the mouth breathing. The appliance was placed on August 12th, 1912; tension applied the next day, and in fourteen days' time you will see that we had accomplished quite a bit of separation. (See slide No. 10.) The results of this case were extremely gratifying, for, previous to the separation, the girl suffered continuously, and was several years behind children of her age in school work, owing to the fact that she could not study. She has started to school again this fall, and her mother reports rapid advancement in her work. This stinging sensation of the nose has entirely disappeared, which shows that not only have we increased the space in the inferior meatus, but in the middle as well. She has had very few headaches, and these have been experienced at a time only when she has been subjected to extreme nervous strain. She has been gaining in weight, and her condition generally is much improved. It will probably be several years before we are able to show any marked improvement so far as normal occlusion and facial contour are concerned, but we hope in time to accomplish a very satisfactory result. In addition to these cases of rapid separation, I have had a number in the short time in which I have been doing this work, and perhaps too few to draw any definite conclusions, but there are several features which have presented themselves in common and which I noted as follows:

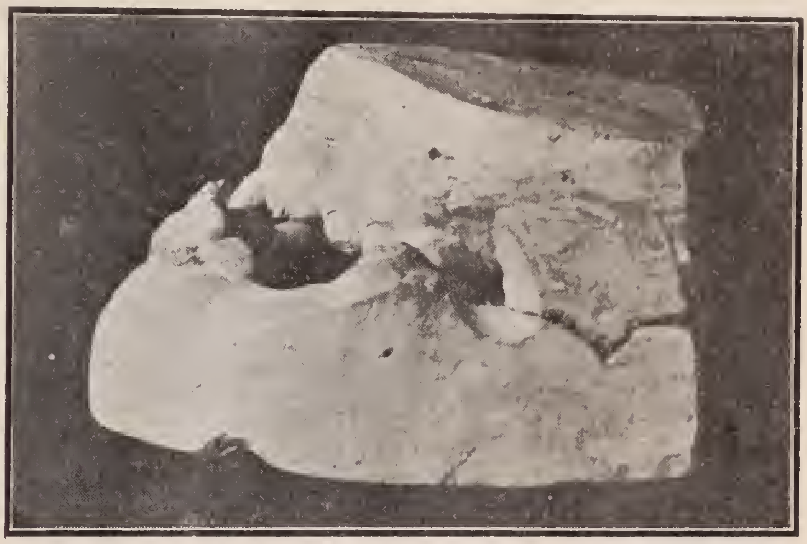


Fig. 7

Fig. 8

1. All, especially the younger patients, were greatly benefited in their general health.
2. In cases of deflected septa, there has been a gradual straightening of the septum.
3. Bronchial and asthmatic attacks have been vastly modified, and recurrent colds practically eliminated.
4. Adenoid removal and intra-nasal operations had not overcome the mouth breathing in all cases, but rapid separation had.

5. In school children, a much greater capacity for mental work and disappearance of nervousness.

6. The very slight amount of pain when the forces are properly applied.

In conclusion, I desire to say that it is necessary for the dentist and the rhinologist to work together. Every patient with nasal obstruction should be sent by the dentist to the rhinologist, and it is equally important that the rhinologist send every patient with contracted arch to the dentist. The various classes of cases must be recognized and dealt with accordingly. First, we have that class of cases showing nasal and post-nasal obstructions, abnormal turbinates, exostosis and deflected septums, high vault and constricted arch. In this class of cases the intra-nasal work should be done first, followed by the orthodontic work. Secondly, we have that class of cases in which the patient complains of never having breathed easily through the nose; we find no pathologic obstructive lesions, turbinates normal except as to position, septum slightly curved, no adenoids, and if they had been previously removed, no beneficial result to any marked degree; vault high, arch constricted. In this class of cases, the orthodontic procedure of maxillary separation, which widens the nasal space by removing the inferior turbinates in a direction away from the septum, will correct the condition, and there is no need of intra-nasal operation.

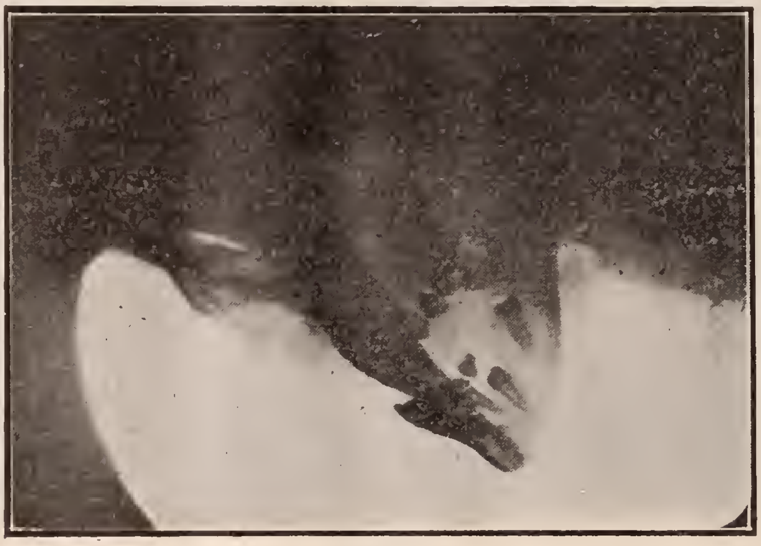


Fig. 9

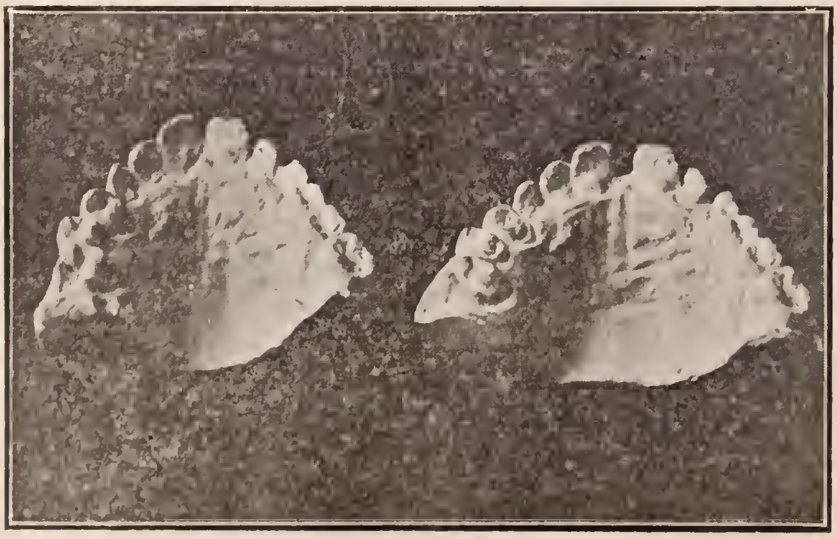


Fig. 10

We may have either of these classes with the normal arch and vault instead of the high vault and constricted arch, showing a faulty development of the bones of the nose, and these also will be relieved by the separation, together with the intra-nasal operation, if necessary. The positive beneficial influence of nasal respiration on the general health of the patient is so thoroughly established in my mind, that I positively insist on the accomplishing of this result if they wish to continue to be my patients, as I do not care to shoulder the responsibility of subsequent ill-results.

Dr. M. H. Fletcher, Cincinnati: Dr. Brown's paper and what has been said in its discussion are matters of vital interest to us, and I agree with all that has been said. What I wish to speak of is an exceedingly important factor, which I hope will tend to impress the great necessity of these operations being performed and performed early.

In one part of his paper the essayist says, "There is, however, a growing feeling that the cause of both the ill results from such conditions, when neglected, and the benefits that have been noted from their correction, lie much deeper than may altogether be accounted for by these etiologic and pathologic factors." It is this deeper cause of which I wish to speak.

Dr. Brown further says, according to Dr. Anderson, the following conclusions are suggested by the results of the experiments:

"That nasal obstruction leads to death, or serious impairment of vitality.

"That the lower resistance predisposes to infection.

"That local disease of the respiratory tract is induced.

"That obstruction of the nostrils leads to dilatation of the heart.

"That changes in the skin and blood of dogs occur.

"That symptoms resembling asthma and emphysema may be induced in lower animals.

"That emphysema of the lungs can be demonstrated histologically.

"That reopening the occluded nostrils is followed by prompt disappearance of these symptoms."

Restoring to the animal the normal amount of oxygen seems to be the reason that these symptoms disappear and the absence of oxygen the cause of the disorders.

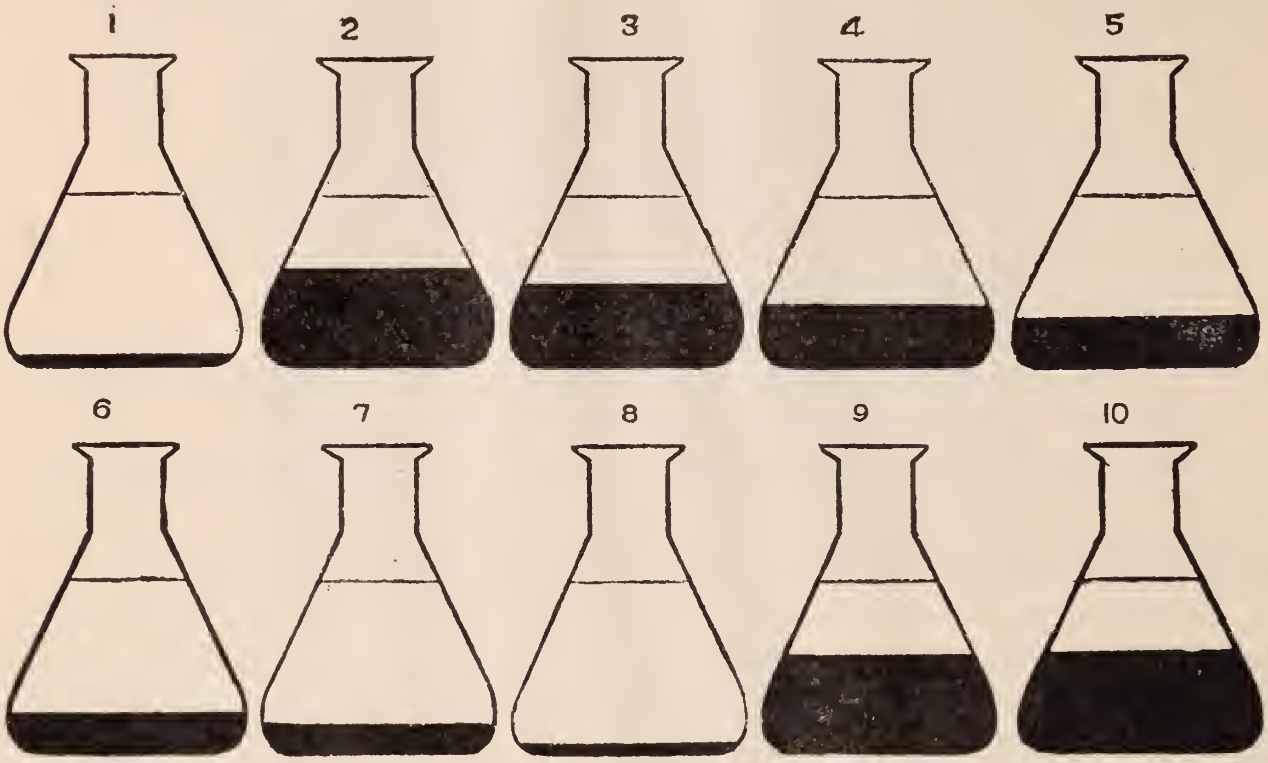
You will notice that all of these operations, as set forth by the essayist, are primarily for the purpose of getting more oxygen. It must be understood, as mentioned by Dr. Thompson, that it is plenty of oxygen, at each breath through proper and normal channels, which is needed. This allows perfect development in children as well as the continuance of good health in both young and old. The inheritance of contracted nasal passages, or the development of adenoids in early childhood, deprives the child of the necessary amount of oxygen for the proper development of all of the tissues. This leads to the abnormal symptoms and disorders mentioned by the essayist and shown by Dr. Anderson's experiments.

I wish to present this point, as it has been worked out, in a little different line, by Dr. Martin H. Fischer, of the University of Cincinnati. He shows how the lack of oxygen may be an important factor in the development of many disorders, especially that of Nephritis, which again emphasizes the necessity of such operations as have been advocated by the essayist.

You may know that Dr. Fischer's work on Edema has been published for two or more years and has been accepted by pathologists and physiologists the world over. It accounts in a simple way for many things in both health and disease which have not before been understood, although many attempts have been made to explain them. Dr. Fischer's work shows that the lack of oxygen permits the accumulation of acids in the colloids of the tissues, thus inducing disease also shows that the proper amount of oxygen, at each breath, tends to prevent this accumulation of acid, and hence is conducive to health.

The colloids of the body are such as the fibrin of the blood and the contents of cells. Common gelatine and egg white are also examples of colloids.

In discussing kidney diseases Dr. Fischer uses this diagram, which he loaned me, to illustrate how acids and alkalies affect the colloids. These flasks are represented as each holding a liter of water. In flask No. 1, a portion of dried blood fibrin has been placed, and the same amount by weight in each flask. Any acid will do, but to flask No. 2 a few drops of Hydrochtone Acid have been added. The fibrin has swollen enormously, as you can see. That is, under this acid condition the fibrin takes up many times as much water as it formerly held. This condition is approached in the body by Lactic Acid, which is formed in the colloidal tissues from insufficient oxygen. Thus an abnormal proportion of water in the colloidal tissues produces edema, and we may have a general condition of dropsy, or local swellings. It may be edema of the glands or skin. The disorder may take the form of heart and blood-vessel disease, headache, indigestion and nervousness. All of these symptoms and many others may be present in the cases under discussion by Dr. Brown. But, you say, these patients are more often anemic and puny. The edematous conditions here described require both water and acid; in other words, water and lack of oxygen. These patients we know are deprived of the proper amount of oxygen and probably have little inclination to drink much water, hence anemia and all it means. The drinking of sufficient water, however, would only change the symptoms from anemia to that of edema. It is only the supplying of the normal respiratory tracts, as presented by the essayist, that will correct these various pathologic conditions.



(Chart from Dr. Martin H. Fischer.)

1—Distilled Water and Blood Fibrin.
2—Plus a few drops Hydrochlanic Acid.
3—Hydrochlanic Acid, plus Sodium Chloride.
4—Hydrochlanic Acid, plus Sodium Nitrate.
5—Hydrochlanic Acid, plus Sodium Acetate.
6—Hydrochlanic Acid, plus Sodium Sulphate.
7—Hydrochlanic Acid, plus Sodium Tartrate.
8—Hydrochlanic Acid, plus Sodium Citrate.
9—Hydrochlanic Acid, plus Urea.
10—Hydrochlanic Acid, plus Alcohol.

To return to the illustrations, Dr. Fischer has shown that the administration of a proper amount of the proper salt will neutralize the acids in the colloids and cause the water to be excreted to its normal amount. This is an established empirical practice, but Dr. Fischer has shown, in a scientific way, how and why it occurs. Flask No. 3 illustrates how the addition of Na Cl (common salt) will reduce the capacity of colloids for holding water. The same quantities of different salts, as indicated under the flasks, are used in the other flasks down to No. 8. This flask shows that the fibrin has discharged all its surplus water and reached its normal condition again. The salts used for this action are the Sodas, Potashes and Magnesias, the Citrates and Tartratis. These can be administered in such quantities as will be very effective in the earlier stages of nephritis and other disorders demanding such treatment. The greatest remedy and the great preventive, however, is the proper breathing of pure air through normal respiratory tracts.

Flask 9 has urea added. Flask 10 has alcohol added, but neither, as you will notice, have any beneficial effects upon the colloids.

Opening the medium suture, as first practiced by Dr. Brown, seems a simple and effective remedy for these important cases and I feel that we cannot give the essayist too much credit for his conception and skill in relieving these sufferers.

The details of the operation and the results upon the tissues were beautifully shown by Dr. H. E. Germann.

John A. Thompson, M. D., Cincinnati: For years rhinologists have been troubled by a class of patients in whom no amount of intra-nasal treatment would restore normal respiration. These were the patients with undeveloped noses and deformed upper jaws. Until Drs. Brown and Black devised the method of separating the upper jaws to increase the nasal space, we had no means of relieving these patients. Why should a doctor be so anxious to restore nasal respiration in a patient where there is obstruction? It is because we see in these patients the same pathological changes that Drs. Anderson and Brown have observed in dogs whose nostrils they have closed. Where there is a failure of the nose to properly perform its function the patient sooner or later has pharyngitis and laryngitis with the resulting cough. This is followed by chronic inflammation in the trachea and bronchi. In a number of these cases asthma complicates the chronic bronchitis and pulmonary emphysema occurs just as it does in the dogs experimented on. There are frequent intercurrent attacks of acute bronchitis and broncho-pneumonia. The heart dilates until the valves are no longer competent. The changes occur much more slowly than in the dogs because the nasal obstruction is never complete, but the end result is the same. After years of suffering the patient dies from the exhaustion of a complication of diseases, each one of which can be traced back to a failure of the nose to perform its physiological function. It is the physiological function of the nose to warm and moisten all the air that we breathe, and sift out of it most of the contained pathogenic germs. No matter what the external temperature of the air may be it is warmed to the temperature of the body by passing through the nostrils in inspiration and is saturated with moisture. If the air is not properly moistened it takes from the mucus covering the lining membrane of the lung an excessive amount of water. The chemists tell you that osmosis will not take place through a dry membrane. If the patient is breathing dry air the blood does not take up enough oxygen for the body and it does not get rid of carbonic acid or other watse gases, so the whole process of nutrition is interfered with by the defect in nasal respiration.

Most of the deformities produced by imperfect nasal respiration are capable of a simple mechanical explanation and we need not invoke the obscure nervous influences mentioned by Dr. Brown. Take the upper lip for example. If you will notice carefully you will see that the undeveloped portion is that part where the fibers of the levator labii muscle are attached. The child with adenoids cannot breathe through the nose and the mouth must be held open to prevent dyspnoea. The constant pull of the levator muscles on the upper lip will at least prevent development. All dentists know and use the pathological law that continuous pressure produces atrophy and intermittent pressure produces hypertrophy.

The production of the deformities of the chest that are present in older children with enlarged tonsils and adenoids can be explained in a similar manner. If you will strip the chest of a child with this form of obstruction and watch carefully you will see the intercostal spaces sink in at each inspiration. This sinking does not occur in normal children. The excessive muscular effort required to force the tidal air through the narrowed space in the upper air passages has its effect in time. The weak cartilages that connect the ribs to the sternum sink in and the sternum protrudes producing the typical "pigeon breast." The tracing shown by Dr. Brown of the respiratory cycle in a dog with closed nostrils, shows the excessive muscular strain exerted where the upper respiratory passages are obstructed.

When a child has adenoids he does not breathe through the nose, and consequently the nose does not grow. The performance of its physiological function is necessary for the growth of any organ of the body. If the nasal cavity is lessened in its vertical dimensions the arch of the palate will be higher than normal. If the nasal fossae are too narrow the arch of the alveolus will be too sharp an ellipse as in the photographs shown on the screen.

I have spoken of the tonsil and adenoid cases because I am more familiar with them. They are not the only causes that prevent normal respiration and proper development.

For one of the patients to be shown by Dr. Germann today, I removed tonsils and adenoids when the boy was six years old, but the operation did not correct the deformity of the jaws or of the chest. The relief given by separation of the jaws is so great in these otherwise hopeless cases that I regard it as the duty of the dental profession to take up this work in connection with the rhinologists. The results are so satisfactory that many more of you today should be doing this work. There are many patients who need it and relief cannot be obtained in any other way.

It is easy for a rhinologist to saw out the turbinated bones and leave a hole in the face for the patient to breathe through. That operation puts him in the condition of a hopeless case of atrophic Rhinitis where the respiratory function of the nose is destroyed, and all the secondary diseases we wish to avoid are sure to follow in time. The better way is for dentist to separate the jaws in the class of cases we are considering. Then the rhinologist can straighten the septum and treat the intra-nasal inflammation and by our joint efforts we can get a real restoration of function, a real cure.

Dr. G. V. I. Brown (closing): I thank the gentlemen who have taken part in this discussion very much for the kind things that they have said, but I feel even more deeply grateful for the things that I have learned from the suggestions given which, as they now appear to my mind, will certainly serve to help me go forward in the future. I want to thank Dr. Casto for his thoughtfulness in taking down Dr. Anderson's experiments and results in detail. This was something that I could not do in my paper, and it was due to Dr. Anderson's memory that it should be done. All the results of his experiments were turned over to me after his estate was settled. I have a vast number of slides of various other portions of the animals as well as the photographs shown today, and it seems too bad that all this should pass away and be forgotten just as soon as a man is dead.

So far as separation of the median palatine suture is concerned, I want to ask you what possible facts I can submit to convince those who doubt its feasibility. I can think of no further evidence. I have offered, on a great number of occasions, before meetings were to be held, to go ten days or two weeks ahead of time and open just as many sutures as might seem desirable, and I shall be glad to do this at any time. What any man may have done and what he may not have done in an experimental way does not affect the real facts pertaining to this procedure in the least. When a question of doubt as to the possibility of opening this suture as described was raised, I was at first surprised, then amused and later very much puzzled to find evidence that would be accepted as final by those unfamiliar with the work and who were honest doubters, because the idea is not new.

In the 80's, Dr. E. C. Angell, of California, reported having done it and other men have reported similar experiments since that time. I, myself, have had it happen accidentally in the course of spreading the dental arch long years ago and did not sleep any too well the following night, through worry, until assured the parts would come together again satisfactorily without permanent injury. I dare say there is scarcely one of the older practitioners here today who has not had a similar experience in the use of the cruder orthodontic appliances of early years.

The cases I have reported nearly all came from the rhinologists or they were sent to rhinologists with instructions to record the actual nasal conditions in such manner as to make it possible at a later examination to determine if intra-nasal enlargement had been brought about or otherwise. I am accustomed to wait until after pressure has been applied through the appliance sufficiently to affect the central incisors and they have begun to separate. When this occurs I know without regard to what any one else may think that the suture between the maxillary bones has parted. The patients are then sent back to a rhinologist who says he has sufficient nasal enlargement, or that he wants more. If more intra-nasal space is required it can be given without difficulty. If any of you will give the matter sufficient thought you may be astonished to find how little we, any of us, know about the occlusion of teeth.

Who knows just what the arc of a circle of the anterior upper teeth of a dental arch should be in a given case? It is quite possible to have good occlusion according to our methods of recognizing the respective relations of the occlusal surfaces of the upper and lower teeth, and yet by making a broader, shorter arch to secure occlusion that is just as perfect, but with the great difference of improved nasal breathing. The perfect nose is, after all, the main thing to be sure of. And when this is secured the arrangement of teeth in both the upper and lower jaws can be regulated accordingly.

The measurements by the instruments of both Dr. Dean, of Iowa City, and Dr. Wright, of Boston, give conclusive evidence that the nose may be widened by maxillary expansion. There is no other way that I know of by which a nose can be widened so that it will show such a measurement within approximately ten days or two weeks. I have had two cases of fracture through the median palatine suture. One they sent for me to close an opening through the hard palate of a man who fell from a motorcycle. I am ashamed to admit that I spent a good deal of time in finding out what was wrong. Finally I discovered that the suture had separated right through the central line of the palate sufficiently to lacerate the mucoperiosteum. His nose was also dislocated. I put it in place and pressed the parts together and he was soon well again.

I was called in consultation to see another case in which exactly the same thing occurred in an automobile accident. We have many radiograms to prove separation in this region and it seems to me that this is at least fairly good evidence that such treatment is possible and that it is within the reach of every orthodontist. There is an abundance of clinical and pathological evidence to prove that no one has a right to delay for six months or a year or any such period, if he can give relief to nasal, bronchial, nervous and other pathologic affections from which children commonly suffer whose dental arches are narrow and palatal vault high, when prompt relief can be given which will mark the beginning of permanent improvement within such a short period as two weeks. I can say this positively today, because this discussion has been of such kindly character that it seems to be possible to make such a sweeping statement without fear of giving offense.

In closing I wish to repeat my expression of appreciation of the kind things that have been said. I have read many papers during recent years, but it has not often happened that one has been discussed in such a way as this one. I thank you all very much.

## Just About Books

All children, and most grown-ups for that matter, hate to go to a book store and ask questions about books unless they are ready to buy them, however desirous they may be for information. This accounts for the large correspondence that has been created by the Book Man department in *St. Nicholas Magazine.* The Book man is a genial person who discourses with children about books through direct correspondence. He has some difficult questions put up to him from time to time; for instance, he was recently asked by an inquiring child, why Bret Harte made fun of a number of great books in his famous "Condensed Novels."

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Rudyard Kipling is conceded to be one of the greatest experts alive in titles for his stories and books. His Jungle Books, which originally appeared in *St. Nicholas Mazagine,* contain many unforgettable titles. Another less distinguished, but widely read contributor to *St. Nicholas,* is Miss Ariadne Gilbert, author of a series of biographical sketches. Her paper on Lincoln is called "The Matterhorn of Men:" on Washington Irving "The Sunny Master of Sunnyside;" on David Livingstone "The Torch Bearer of the Dark Continent."

# CORRESPONDENCE

## THE PHILOSOPHY OF MASTICATION

### A REPLY TO DR. HOPKINSON

BY GEORGE M. NILES, M.D.

PROFESSOR OF GASTRO-ENTEROLOGY AND CLINICAL MEDICINE, ATLANTA MEDICAL COLLEGE, ATLANTA, GA.

In the *Journal of the American Medical Association,* March 29th, 1913, I published an article under the above title, in which I argued the following basic principles:

1. Mastication is an entirely voluntary act, while the performance of swallowing, though initiated voluntarily, is, for the most part, completed independently of the will; and that this complete act is facilitated by moist food on the tongue, a pleasant taste, and a favorable mental attitude.

2. That slow, deliberate, and systematic mastication is not a *sine qua non* for health in every individual, irrespective of temperament or station in life.

3. That it is not conducive to the best work of the digestive organs that a hard-and-fast rule be enjoined, whereby a certain stated period must be devoted to the mastication of a meal, regardless of the pleasure of the masticator.

4. That as regards the protein constituents of food, insalivation exerts but little effect; that the pepsin and hydrochloric acid in the stomach or the trypsin beyond will attend to them, if they are decently comminuted, and that their stay in the mouth need be only long enough to originate those psychic impulses, which, as shown by Pawlow, regulate the subsequent flow of digestive juices. That, as the essence of salivary digestion is the transformation of starch into sugar by the action of the ptyalin, and that process, though inaugurated in the mouth, continues until the whole of the stomach-contents become acid, that, as the time of salivary digestion is brief, to be effectual it should be energetic.

5. That the method or comparative rapidity of chewing is to a great extent temperamental, and that, as some individuals move quickly, speak quickly, and think quickly, so may some individuals *chew* quickly, but well.

6. That life is too short for interminable mastication, and that forcing upon busy people a wearisome chewing of inanimate food is an anachronism upon twentieth-century civilization.

7. Finally, that the magnification of one division of the alimentary tract is intrinsically wrong, is conducive to gastronomic introspection and analysis, and in many instances proves an opening wedge for various digestive ills.

In no part of my article did I minimize the value of or necessity for adequate mastication, but I note in the October number of THE DENTAL SUMMARY a perfervid communication from Dr. Merrill Hopkinson, in which he takes vehement issue with me, an adorns his rhetoric with such phrases as "suppositious joker," "fanciful whims," "unthinkable and absurd"—all, and others just as strong, aimed at my modest article, in which I endeavor to impress some real truths and correct some venerable fallacies.

The above choice examples of invective are beside the mark, and require no reply from me.

Any one sufficiently interested can obtain the whole article by request, and decide whether or not I have proven my contentions.

That this statement from Dr. Hopkinson: "If the views expressed by Dr. Niles are held by any number of medical men, although this does not seem possible * * * " is incorrect will be proved by three personal communications just received from specialists in gastrointestinal diseases, men whose standing in the world of medicine is assured, and whose opinions are worthy of consideration.

> "I fully agree with your paper 'The Philosophy of Mastication.' You will find similar views expressed in my paper 'The Art of Eating Properly and the Harm of Eating too Rapidly or too Slowly,' *Medical Record,* Jan. 7th, 1905.
>
> "MAX EINHORN,
> "*Professor of Medicine, New York Post Graduate Medical School.*"

> "I have never advised Fletcher's extreme measures, and think of nothing more disgusting than to observe a Fletcher pupil in action. I have never advocated 'Fletcherism.'
>
> "ROBERT COLEMAN KEMP,
> "*Professor of Gastrointestinal Diseases, Fordham University.*
> "*New York City.*"

> "I have read your pamphlet with great interest.
>
> "It seems to be a conflict between Fletcher, and the recent Scientific work done by Pawlow, Cannon and others. To make mastication a purely mechanical act, and a burden, is certainly to destroy the psychological stimulus for digestion.
>
> "Personally I have stopped everyone I could from Fletcherizing, because it seemed unnecessary and unscientific.
>
> "While deprecating hasty eating and bolting of food, I see no reason for going to the other extreme, and I think you are to be congratulated on your courage in expressing your convictions on so popular a subject—convictions with which I am in complete accord. GEORGE ROE LOCKWOOD,
> "*Profesor of Clinical Medicine in the Columbia University.*
> "*New York.*"

I think I can safely submit my case to all whose mental horizons extend further through the digestive canal than the first three inches; and with the testimony of such men, for those who do not know of these three scientists, as Beelzebub was quoted, "argue themselves unknown."

920 Candler Building.

# EDITORIAL

## Forced Loans and Their Cost

A good many years ago I loaned a man $500 at six per cent. interest for one year.

The end of the year came around on time, as such things have the habit of doing, but Mr. Borrower did not.

One month, two months rolled into the past, and still he did not come. The security was ample; I had no cause to worry. I thought I could stand it if he could.

At the end of the third month, along came the debtor, said he wanted to pay off the loan, and counted out $530.

Then he got what he said was the surprise of his life. I often have wondered whether he told the truth.

This is what happened. I took his $530 and asked for the balance due me.

In apparent surprise—maybe it was real; I've never been sure about that; one never can tell what might surprise some people, particularly people who are as ignorant as they seem; anyhow, in apparent astonishment he said:

"What balance? Ain't that right? Didn't I just give you $530?"

"Yes."

"Well, didn't I borrow $500 and wa'n't the interest to be 6%?"

"Yes," again.

"Well, that's $530 ain't it?"

"Yes, that's $530 for one year, but you have had my money for fifteen months, and you owe me interest for that much additional time."

"Why, you ain't going to charge me for that little time, are you? I never heard of such a thing in my life!"

"That 'little time,' as you call it, is just a quarter of another year, and of course I'm going to charge you for it; you owe me $7.50 more for that."

"Well, you beat the Jews. No wonder poor men never get ahead any."

"Hold on; is this a matter of charity or a question of business? If it's business, you owe me $7.50 more interest on the $500, and you also owe me three months' interest on the $30 that my $500 earned up to the time your note was due, and that's 45 cents more. All told, you owe me $537.95."

"I never'll pay it."

"O, yes you will, when you have had time to think it over a little. Now, see here. In the first place you came to me and asked me to loan you $500; didn't you?"

"Yes, and you were mighty glad to loan it, too."

"Of course I was; that's what money is for. But weren't you just as glad to get it? Didn't you tell me that it would be a big accommodation to you; that you didn't see just how you would manage to get along if I didn't let you have it; that you needed it in your business?"

"I suppose so."

"I seem to remember that you said something about your boy in college; about some scrape he had got into that had to be settled or he suffer expulsion, or something like that?"

"Yes; darn that boy. He's a good boy, and I didn't want him to lose out in his last year just because he'd done something that thousands of other boys do and never get found out. He's started to practice now, and is doin' pretty well."

"Well, then; we're even on that score. You wanted the money, had good security, and I wanted to loan it. We made a bargain that you were to have the money for one year; that you were to pay interest for its use; that you were to pay it back at the end of the year. So far everything was all right, everything was understood, the whole thing was mutually satisfactory. Had you kept your end of the bargain I would have kept to mine, and there would have been an end of the matter. But what did you do?"

"Well, I couldn't pay you then."

"You didn't, anyhow. But you ought to have come to me and asked me if I could let you have the money for a few months longer; did you do that?"

"I thought a few days wouldn't make any difference to you."

"You had no right to think that. How did you know that your keeping the money as long as you wanted it might not be very inconvenient to me, to say the least? You didn't know but that I might need it to pay some other man money that I owed him; you didn't know whether that five hundred was all I had in the world or not; you didn't know anything about it, and you didn't ask; you didn't care. It didn't suit you to pay it, and you simply forced me to loan you not only the principal but the interest as well for as long as you cared to keep it, without my consent.

"Another thing: three months isn't what you might call 'a few days;' it's a quarter of a year, and that's as long as any bank will loan me or anybody money without a renewal; and if I want a renewal I'm pretty certain to be asked what I want to do with the money and a lot of other questions. If I had needed the money that you kept to suit your convenience, I should have had to go to the bank for it and pay just as much, if not more, than I'm charging you. See?"

"Well, but how about chargin' me interest on that thirty dollars? I don't think you ought to do that."

"Why not? Didn't you compel me to loan you that thirty, as well as the rest?"

"Well, but it seems so little."

"I know, but it is from just such little things that larger sums are made up. Thirty dollars is just six per cent. of five hundred. If five hundred is worth paying for, so is thirty. Of course, I can give you the 45 cents if you want me to do that, but if this is a matter of business you don't want me to make you any presents; you want to pay for the accommodation that you have had."

And he did.

To make an application of this little incident to every-day business seems hardly necessary. Surely, every reader will see that accounts not paid when due become an enforced loan, a loan that is not even asked for, often and often; and surely every reader knows that every large mercantile concern must borrow money and pay for its use in order to carry customers who do not pay, many of whom feel just as my borrower said that he felt when I insisted upon his paying me *WHAT IT SHOULD HAVE COST ME TO CARRY THE LOAN HAD I BORROWED THE MONEY.*

If business were conducted upon a strictly cash basis, very few well-established mercantile concerns would need to use borrowed money; even if bills are paid strictly and promptly when due, borrowing would be reduced to the minimum. Interest charges paid to banks are made necessary by delinquent customers. Such interest charges make up a part of the expenses of doing business, and must be added to the cost of the goods sold unless the seller is seeking an entrance to the court in bankruptcy. Somebody must pay.

In the case of my borrower he was my only "customer;" he had the whole amount, and had to pay for the whole of it. The capital of the dealer is divided up into many small accounts, each of which must pay a little of the cost of carrying "enforced loans," loans that probably would not be made if consent of the creditor were asked.

Everybody knows, every man who wears clothes knows, that men who pay the tailor help to clothe the men who don't pay. Well, every other business is in just the same condition; those who pay help to carry those who do not.

The man who pays cash for the goods he buys, either at the time of purchase or in accordance with terms agreed upon, establishes both character and reputation that will be worth dollars, and something a great deal more valuable than dollars, continuously throughout life. The fulfillment of obligations assumed when purchases are made is a part of the duty of every man, the neglect of which not only forces unjust burdens upon the shoulders of the dealer, but its reaction upon character is sure to be such as greatly to interfere with the ultimate, lasting and real success of the man who permits himself to fall into such habits.

The man who does not pay his debts as agreed deprives the men who befriend him of the proper and legitimate fruits of their industry and thrift; especially is this true in the dental business, in which, I can assure you, profits are so small that even an occasional lost account is a serious matter.

Nobody admires real ethical conduct more than the writer; but that sort of ethics that "strains at a gnat and swallows a camel" is one of the things that is acting as a brake on the wheels of progress in the dental profession as well as in every other line.

G. E. Harter.

## The Teeth and Life Insurance

That dental and oral conditions have an influence on the health of individuals is being recognized by life insurance companies. During the past year one of the large companies, the Metropolitan, has issued a pamphlet, "Teeth, Tonsils and Adenoids," in which is stated that it is "printed and distributed by the Metropolitan Life Insurance Company for the use of its policy holders."

The issuing of a pamphlet of this character is commendable and shows a progressive spirit on the part of this insurance company. While some portions of the text would have been more exact had it been written by a dentist it is an acceptable publication as it is and will undoubtedly prove of value as an educational medium along these lines.

People are awakening to the fact that diseased conditions of the teeth and mouth are more detrimental to health than they formerly supposed and one of these days general dental and oral conditions will be taken into account when examining applicants for life insurance.

## A New Department

Beginning with the January number The Dental Summary will have a department devoted to "The Business Side of Dentistry" in which will be discussed the various phases of this important subject. One of the features will be a series of articles written expressly for our readers by "A Business Man," who has had years of experience along dental lines and has made a special study of the needs of dentists so far as business methods are concerned. He will discuss such subjects as: Business Methods, Fees, Profits, Accounting, Accounts Payable and Bills Payable, Accounts Receivable and Bills Receivable, Banking Connection, the Draft, Purchases, the Dentist as a Collector, the Dentist's Reserve, Dentistry as a Profitable Money-Making Profession, etc. It is expected that these articles will appear each month during the coming year.

Aside from these there will be contributions from others discussing dental business problems and we want our readers generally to contribute to this department that it may be made as mutually beneficial as possible.

## The Old and the New

With this issue we close another volume of this magazine and believe it has been profitable to our readers. The largest subscription list in the history of the publication indicates this. But the editor and publishers are not yet satisfied. They want to make it still better and efforts will be directed toward this end. We want it to be "the one dental journal that no dentist can afford to be without." You, dear reader, can assist us in this and we want you to give other readers the benefit of helpful suggestions along any line of dentistry. We appreciate the assistance that readers have given in the past and hereby acknowledge, with thanks, the many contributions received during the year just ending.

At this time we desire also to extend to our many readers our best wishes for a merry Christmas and a happy and prosperous New Year.

## A New Method of Teaching Modern History

A classic name in American literature has become identified with a new method of teaching modern history. A striking illustration in *The Literary Digest* of January 11 shows "A Class in History of the Present" —one class of only a baker's dozen from the more than four hundred girls who are studying *The Literary Digest* in the Washington Irving High School, New York City. It appears, from an article accompanying the illustration, that Dr. William H. Maxwell, Superintendent of Schools, recently sent out to all the city teachers a circular, saying:

"Many pupils have a not unnatural suspicion of 'classics.' They have a natural interest in what other people are reading and talking about. They should be induced to read the better magazines. This will tend to overcome the prevalent misconception in the minds of young students that literature belongs to the past.

The "Washington Irving" is the largest High School in Greater New York, and probably in the country, having an enrolment of 4,764 pupils. An immense new edifice is now nearing completion, on Irving Place, to house them. Miss Jean Davidson, one of its teachers, tells how they use *The Digest*, and what its impressions are upon the students. From "an interesting collection of opinions of the girls themselves" these expressions are quoted by her: "I like this because I want to know what is going on in the world today"; "I think this is keeping me from growing one-sided"; "I begin to know what people are talking about"; "I like to read about live men instead of dead ones"; "My father says he is glad I am doing one thing in school he understands and sees the use of"; "I was able to show my brother he didn't know everything."

# LISTERINE

Listerine is a fragrant non-toxic antiseptic composed of volatile and non-volatile constituents, agreeable to the taste, refreshing in its application and lasting in its antiseptic effect.

Listerine is of well-proven value in the antiseptic treatment of all parts of the human body—whether by spray irrigation, atomization or simple local application, and is well adapted to the requirements of general

## DENTAL PRACTICE

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# SOCIETY ANNOUNCEMENTS

## North Dakota Board of Dental Examiners

The next meeting of the North Dakota Board of Dental Examiners will be held at Grand Forks, North Dakota, January 13th, 14th, 15th and 16th, 1914. All applications for examinations must be in the hands of the Secretary by January 3d, 1914.

For further information apply to

F. A. BRICKER, *Secretary.*
*Fargo, N. D.*

## Wisconsin State Board of Dental Examiners

The Wisconsin State Board of Dental Examiners will convene in Milwaukee at the Hotel Maryland, on December 15th, 1913, at 10 o'clock A. M. for examination of applicants to practice in Wisconsin.

High School diploma, application and $25.00-fee to be filed with the Secretary five days prior to above date.

Dental diplomas to be presented in advance of the examination.

F. A. TATE, *President.*
W. T. HARDY, *Secretary,*
*422 Jefferson St., Milwaukee.*

## Minneapolis District Dental Society

The annual meeting of the Minneapolis District Dental Society will be held in the Masonic Temple, Minneapolis, January 16 and 17, 1914. From the data now at hand this meeting promises to be a gathering of many of the best men of the country.

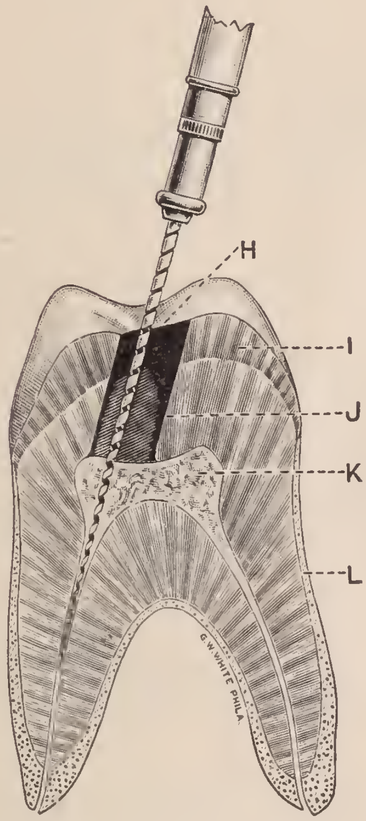
A. A. ZIEROLD, *Secretary,*
*902 Donaldson Building, Minneapolis.*

## National Association of Dental Faculties

The National Association of Dental Faculties will meet in Buffalo, New York, at 10 A. M. on the morning of January 26th, 1914. This is in accordance with the resolution adopted at the last annual meeting to meet in conjunction with the Institute of Dental Pedagogics. The Executive Committee will meet at 9 o'clock on the same morning.

*Signed:* EXECUTIVE COMMITTEE.

# IVORY'S NERVE EXTRACTORS



These broaches are solely for the purpose of removing nerves. By twisting in the fingers or in the holder, the Ivory Broach is drawn into the canal, wrapping itself around the nerve with each turn of the broach. It does not tear the nerve in shreds in case it is partially decayed, because the broach winds in a spiral manner around the nerve fibers and contents of canal. It does not push or force matter ahead of the point as is the case with other broaches.

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## Arizona State Dental Society

The following officers were elected at the fifth annual session of the Arizona State Dental Society in Phoenix, Nov. 5, 6, 7, 1913: President, W. A. Baker, Tucson; Vice-President, J. L. O'Connell, Phoenix; Secretary-Treasurer, H. H. Wilson, Phoenix. Board of Directors—W. A. Baker, Tucson; H. H. Wilson, Phoenix; W. P. Sims, Bisbee; Eugene McGuire, Phoenix; T. A. Balmer, Clifton. Board of Censors—L. B. Cary, Douglas; W. E. Hankin, Bisbee; J. D. Holcombe, Globe. Committee on Public Dental Education—J. F. Teufert, Yuma; A. B. Rood, Hayden; L. C. Shaw, Tucson.

## The Marquette Alumni Association

The Marquette Dental Alumni Association will hold its Eighth Annual Clinic and Dealers' and Manufacturers' Exhibit at the Auditorium in Milwaukee on Jan. 22d and 23d, 1914.

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